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ANNUAL REPORT

AND

TRANSACTIONS

OF THE

PLYMOUTH INSTITUTION

AND

Devon and Cornwall

NATURAL HISTORY SOCIETY.

VOL. VII. PART II.

1879–80.

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ANNUAL REPORT

OF THE

PLYMOUTH INSTITUTION

AND

Devon and Cornwall Natural History Society.

1879–80.

OFFICERS OF THE INSTITUTION.

SESSION 1879-80.

President.

MR. J. BROOKING ROWE, F.S.A., F.L.S.

Vice-Presidents.

DR. ROBERT OXLAND, F.C.S.
REV. PROFESSOR CHAPMAN, M.A.
DR. J. MERRIFIELD, F.R.A.S.
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Secretaries.

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MR. JAMES C. INGLIS, C.E.

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Library—MR. T. R. A. BRIGGS, F.L.S.
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Zoology—MR. G. JACKSON, F.R.C.S.
Botany—MAJOR J. A. J. BRIGGS.
Geology and Mineralogy—MR. F. J. WEBB.

Members of Council.

DR. WILLIAM H. PEARSE.
MR. R. BISHOP.

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LIST OF MEMBERS.

HONORARY MEMBERS.

Elected.	Name.	Address.
1865	Adams, J. C., D.C.L., F.R.A.S.	The Observatory, Cambridge.
1877	Beal, Rev. Professor, B.A., M.R.A.S.,	Falstone Rectory, Northumberland.
1856	Coleridge, Rev. Derwent	Hanwell, Middlesex.
1874	Froude, James Anthony, M.A.	5, Onslow Gardens, London. W.
1859	Gibbs, F. W., C.B.,	24, Mount Street, Grosvenor Square, London.
1877	Günther, Dr. A., F.R.S., F.L.S., F.Z.S.,	British Museum, London.
1865	Lubbock, Sir John, Bart., D.C.L., F.R.S., F.L.S.,	High Elms, Kent.
1874	Pengelly, W., F.R.S., F.G.S.	Lamorna, Torquay.
1859	Scrivener, Rev. F. H. A., M.A., LL.D.,	Hendon, Middlesex.
1875	Temple, Right Rev. Dr., Bishop of Exeter,	The Palace, Exeter.
1865	Vivian, Edward, M.A.	Torquay.
1872	Weymouth, R. F., D.LIT.	Mill Hill, London.
1872	Worth, R. N., F.G.S.	Seaton Avenue, Mutley.

LIFE MEMBERS.

1855	Alger, J	Sydney, Australia.
1863	Alger, W. H.	Widey Court, near Plymouth.
1856	Bartlett, G.	Plymouth.
1857	White, James	London.

CORRESPONDING MEMBERS.

1856	Barham, C., M.D.	Truro.
1857	Blewett, Octavius	London.
1857	Boase, H. S., M.D., F.R.S., F.G.S.	Dundee.
1856	Harding, Col., F.R.S.	Upcott, Barnstaple.
1858	Ormerod, G. W., M.A., F.G.S.	Woodway, Teignmouth.
1858	Peach, C. W., A.L.S.,	30, Haddington Place, Edinburgh.
1851	Towson, J. T.	Liverpool.
1863	Vicary, W., F.G.S.	Exeter.

LECTURING MEMBERS.

1868	Adams, W.	Sussex Terrace.
1876	Amery, Fabyan	Druid, Ashburton.
1860	Anthony, Rev. Prof., M.A.	Woodland Terrace.
1852	Bate, C. Spence, F.R.S.	Mulgrave Place.
1858	Balkwill, F. H.	5, Clarendon Place.
1863	Bennett, E. G.	Woodland Terrace.
1826	Bennett, J. N.	Windsor Villas.
1877	Bird, Rev. Benwell	3, Elm Road, Mannamead.

LECTURING MEMBERS—*continued.*

Elected.	Name.	Address.
1854	Bishop, R.	Clarendon House, North Street.
1861	Brent, Francis	19, Clarendon Place.
1862	Briggs, T. R. A., F.L.S.	Richmond Villa, Saltash Road.
1870	Briggs, Major J. A. J.	Richmond Villa, Saltash Road.
1851	Cater, Samuel	North Devon Place.
1876	Chapman, Rev. Prof., M.A.	Western College, Mannamead.
1870	Clark, Philip	Southside Street.
1853	Collier, Sir R. P.	Eaton Place, London.
1851	Collier, W. F.	Woodtown, Horrabridge.
1876	Collier, Miss Bertha Cycill	Woodtown, Horrabridge.
1876	Collier, Charles Calmady	Woodtown, Horrabridge.
1867	Collier, Robert	7, Chelsea Embankment, London.
1877	Coney, Rev. Thomas, M.A.	4, Wingfield Villas, Stoke.
1875	Cragoe, Thomas Adolphus, F.R G.S.	Woodbury, Truro.
1874	Earle, The Ven. Archdeacon	The Vicarage, West Alvington, Kingsbridge.
1874	Fouracre, John T.	Chapel Street, Stonehouse.
1875	Fox, Francis E., B.A., F.R.G.S.	Uplands, Tamerton Foliot.
1868	Fox, R. R.	Westbrook, Tamerton.
1851	Harper, T., M.R.C.S.	1, Gibbon Street.
1852	Hine, James, F.R.I.B.A.	Mulgrave Place.
1867	Hingston, C. Albert, M.D.	2, Sussex Terrace.
1875	Hodge, Rev. J. M., M.A.	38, Tavistock Place.
1875	Hughes, R. H., M.A., M.B., M.R.C.S.	12, Lockyer Street.
1876	Inglis, James, C.E.	11, The Crescent.
1868	Jackson, George, F.R.C.S.	1, Saint George's Terrace.
1851	Jago, George	Cobourg Street.
1851	Keys, I. W. N.	Whimple Street.
1870	Lewis, J. D.	30, Eaton Square, London. S.W.
1875	Lewis, Lewis, M.R.C.S.	1, St. Michael's Terrace.
1873	Liscombe, Robert Lavers	Mount House, near Plymouth.
1874	Merrifield, John, PH.D., F.R.A S.	Gascoyne Place.
1862	Mitchell, Philip	Bedford Terrace.
1851	Moore, W. F.	The Friary.
1870	Morley, The Right Honourable the Earl of	
1861	Mount Edgcumbe, The Right Honourable the Earl of	
1878	Nield, Frederic, M.D.	6, Sussex Terrace.
1874	Oxland, C.	Portland Square.
1851	Oxland, R., PH.D., F.C.S.	Portland Square.
1871	Pearse, W. H., M.D.	1, Alfred Place.
1859	Prowse, A. P.	Yanadon, Horrabridge.
1880	Power, W.	43, Tracy Street.
1875	Rider, A.	4, Haddington Road, Stoke.
1857	Risk, Rev. J. Erskine, M.A.	Princess Square.
1861	Rowe, J. Brooking, F.S.A., F.L.S.	Lockyer Street.
1875	Sharman, Rev. W.	20, Headlands Park.
1874	Shelly, Arthur	23, Woodland Terrace.
1860	Shelly, John	Princess Square.
1875	Smith, Robert	Bedford Street.
1867	Slater, D., M.A.	Cheveley Hall, Mannamead.
1869	Square, W., F.R.C S., F.R.G.S.	Portland Square.
1874	Square, Elliot	Athenæum Terrace.

LECTURING MEMBERS—*continued.*

Elected.	Name.	Address.
1876	Tippetts, G.	The Mount, Mannamead.
1865	Tweedy, W. Gage, B.A.	Athenæum Terrace.
1875	Webb, F. J.	22, St. James's Place.
1875	Weekes, Samuel	Sussex Terrace.
1875	Whiteford, Hamilton	Courtenay Street.
1876	Windeatt, Edward	Totnes
1873	Woollcombe, R. W.	St. Jean D'Acre Terrace, Stoke.
1879	Worth, R. N., F.G.S.	4, Seaton Avenue, Mutley.
1878	Wright, W. H. K.	4, Headlands Park.
1873	Young, Sir George, Bart.	15, Hyde Park Gate, Lond S.W.

"The property of the Institution, the election of members, management of the concerns, and enactment of laws, are vested exclusively in the Lecturing Members."—LAW 2.

ASSOCIATES.

Allport, S., 48, North Street
Alty, Henry, Radnor Place

Barrett, G. R., Bank of England Place
Barrett, J., 8, Staddon Terrace
Bayly, John, Seven Trees
Bayly, Robert, Torr Grove, near Plymouth
Bignell, George C., 8, Clarence Place, Stonehouse
Bazeley, William, Princess Square
Bennett, John, Princess Square
Bond, A. James, 6, Gascoyne Place
Brendon, W. Turner, George Street
Bridson, H., Warfleet, Dartmouth
Brown, J. H., Woolster Street
Brown, George H., Mill Lane
Brown, Henry, North Hill House

Cawse, Henry, Old Town Street
Clark, W., Thorn Park Villas
Cole, A., Bedford Street
Compton, C. E, 2, Mutley Park Ter.
Cox, G., Manor Office, Stonehouse
Cridland, J. C., 45, Durnford Street, Stonehouse

Deacon, Josiah, 45, Durnford Street, Stonehouse
Derry, Wm, Houndiscombe House
Deutsch, Herr, 5, Crescent Place
Diment, Thomas, Laira House

Edmonds, R. G., Mount Drake
Eliott, Joseph, 3, Clarendon Place
Eliott, E., Lockyer Street
Ewing, Rev. T. J., D.D., 4, Crescent Villas

Fagan, Arthur, 45, King's Gardens
Foster, J. B., 4, Cambridge Street
Fowler, F. F., Elm Road, Mannamead
Francis, H, 22, Ker St., Devonport
Freeman, Francis Ford, Blackfriars House

Geake, Edward, Eglington Villas, Mannamead
Gibbons, Wm., 35, Tavistock Place
Glover, George, Mulgrave Place
Goulding, F. H, George Street
Goad, J., 1, Buckingham Place, Stonehouse
Greenham, William, Lipson Cottage, Plymouth
Grepe, J., 4, St. James's Terrace
Groser, Albert, North Devon Place

Haldane, Alex., 10, Athenæum Place
Hall, Frederick, George Street
Harris, Henry Vigurs, Union Street
Heath, William, George Street
Hicks, Francis, Burrington Park
Hoppen, Vosper, George Street
Hubbard, G., Ford Park, Mutley
Inskip, Capt., R.N, F.R.G.S., Houndiscombe Place

Jago, C. S, Cobourg Street
Jago, Edward, 6. Athenæum Terrace
James, W. C, Woodside
James, E. H., Woodside
James, Edward, Greenbank
James, Capt., R. W. Yacht Club
Jameson, Dr., 2, West Hoe Terrace
Jones, Dr. C. Marchant, St. Andrew's Terrace
Julian, Capt. T. A., Woodside

Keen, Henry, St. James's Terrace
Kendall, Miss A. C., Plymouth High School
Kerswell, Alfred J., Ham Street
Kerswill, F. J., Frankfort Street
King, William, Hoe House

ASSOCIATES—*continued.*

Latimer, Alfred, Glen View, Mannamead
Luscombe, H. A., 35, Clifton Place

Manton, Wm., Alexandra Place, Mutley
McCallum, Miss F. J., 5, Stopford Place, Stoke
Martin, W. L., Windsor Villas
Mitchell, T., Eton Villas
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Morrish, F. A., 2, Bedford Terrace
Morris, Charles, 4, Edgcumbe Place, Stonehouse

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Payne, James, 21, Clarendon Place
Parson, T. Edgcumbe, 36, Torrington Place
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Pearse, T., M.D., Flora Place
Pearse, S., Royal Hotel
Penson, James, Boon's Place
Philips, G., 1, Victoria Place, Stonehouse
Picken, Samuel, Hill Park Crescent
Pike, W. H., Clock Tower Chambers, George Street
Pinwell, Capt. Treharne, Truro
Polkinghorne, E., Eliot Terrace
Prance, H. Penrose, 7, Athenæum Terrace
Preston, H., Old Town Street

Radford, C. H., 37, Bedford Street
Randle, J., Union Street
Rew, G. Gale, Lockyer Street
Rice, J., Athenæum Street

Serpell, E. W., 19, Hill Park Crescent
Skelton, J., L.R.C.P., Grenville House, 6, Albany Place [Stoke
Smith, A. Bentley, Valletort Place,
Snell, H. B., 92, Union Street
Soltau, G. W., Little Efford
Spooner, E., 23, Portland Square
Square, Wm. Joseph, F.R.C.S., Portland Square
Stephenson, G., Old Town Street
Stephenson, R., National and Provincial Bank of England, Devpt.
Stribley, Edward, Headland Villas

Tanner, C. F., Mutley House
Tarner, W. E., 8, West Hoe Terrace
Taylor, J., jun., Flora Street

Walkem, W. L., Emma Place, Stonehouse
Watt, Edward, 12, Torrington Place
Westlake, T. H., Torrington Place
Wheeler, Rev. H., Drake Street
Widger, James, 14, Tavistock Street
Willoughby, J., 33, Wyndham Place
Wilson, J. Walter, Hoe Park Terrace
Wills, J. C., 33, Edgcumbe Street, Stonehouse
Windeatt, John, Woodland House
Woodhouse, Henri B. S., 15, Portland Square

LADY ASSOCIATES.

Borland, Mrs. R., Emma Place, Stonehouse

Gaillardon, Mdlle., St. James's Place

Issanchou, Mdlle., 1, Leigham Terrace

Key, Miss Amy, 10, Hyde Park Ter.

Parker, Miss S., Torrington House
Pomeroy, Mrs., 1, Edgcumbe Street, Stonehouse
Pomeroy, Miss H., 1, Edgcumbe St., Stonehouse
Pomeroy, Miss S., 1, Edgcumbe St., Stonehouse
Puzey, Mrs., 37, Torrington Place

Rumble, Miss, Courtenay Street

Thompson, Miss C., 8, Ermington Terrace
Treeby, Mrs., 297, North Road
Twose, Mrs., 4, Clarendon Place

Waghorn, Miss, 1, Portland Place

JUNIOR ASSOCIATES.

Burton, William Spelman, 18, Gascoyne Terrace
Goad, John, jun., 1, Buckingham Place, Stonehouse
Goad, Charles E., 1, Buckingham Place, Stonehouse
Hawken, A. E., 11, Old Town Street
Pethybridge, Henry Mudge, Rooker, Matthews, and Co.

THE SECRETARIES' REPORT.

1879–80.

The Secretaries present to the Society the following Report of the proceedings of the Session.

The Papers read were:

1879.		
Oct. 2.	Inaugural Address	The PRESIDENT.
,, 9.	Conversazione	
,, 16.	Leisure	Mr. R. COLLIER.
,, 23.	A Popular Exposition of Darwinism	Rev. WM. SHARMAN.
,, 30.	The Pastures of the South-West	Mr. THOS. A. CRAGOE, F.R.G.S.
Nov. 6.	Chemical Action	Mr. ALONZO J. RIDER, F.C.S.
,, 13.	The Druidical Myth	Mr. R. N. WORTH, F.G.S.
,, 20.	The *Œdipus Coloneus* of Sophocles	Sir GEORGE YOUNG, Bart.
,, 27.	Pliny's Letters	Mr. J. D. LEWIS, M.A.
Dec. 4.	The Phœnicians and their Neighbours	Rev. J. M. HODGE, M.A.
,, 11.	The Decay of the Old Cornish Language	Rev. W. S. LACH-SZYRMA, M.A.
,, 18.	Judges and Advocates	Mr. HAMILTON WHITEFORD.
1880.		
Jan. 8.	Conversazione	
,, 15.	Roman Devon	THE PRESIDENT.
,, 22.	Surveying by Photography	Mr. W. A. TWEEDY, B.A.
,, 29.	Sanitary Science in Rural Districts	Mr. J. C. INGLIS, C.E.
Feb. 5.	The Chemistry of Carbon	Dr. OXLAND, F.C.S.
,, 12.	The Irish Bards	Mr. W. POWER.
,, 19.	Exchanges	Mr. A. P. PROWSE.
,, 26.	Shakspere's *Coriolanus*	Mr. W. ADAMS.
Mar. 4.	Rome in the 2nd Century A.D.	Rev. J. ERSKINE RISK, M.A.
,, 11.	Samuel Prout, Artist: The Lessons of his Work	Mr. J. HINE, F.R.I.B.A.
,, 18.	The Natural History of Coal	Mr. F. J. WEBB.
,, 25.	The "Stone Implements"	Mr. FRANCIS BRENT.

The whole of the Lectures announced on the cards were read and discussed, and larger audiences than during former years have been present, the average attendance being seventy-seven.

Two lecturing members, thirty associates, seven lady associates, and four junior associates have joined the Society during the year, the numbers on the books now being seventy-one members, one hundred and fifteen associates, fourteen lady associates, and five junior associates.

The Society has lost by death one of its honorary members, Mr. W. Froude, of Chelston Cross, Torquay, and a corresponding member, Mr. E. Hearle Rodd, of Penzance—short notices of whom will appear in our Obituary.

The annual excursion was held on the 19th June, at Two Bridges and Wistman's Wood, Dartmoor, and was attended by a large number of members and visitors, who returned to a tea provided at the Bedford Hotel, Tavistock.

At the Anniversary meeting, held on May 1st, and which was well attended, the following short papers were read and discussed; viz.:

"On Tiles found on the site of Plympton Priory"	THE PRESIDENT.
"Notice of Earthquake Shocks felt in Plymouth on April 8th and 30th" .	MR. C. OXLAND.
"The Metric System of Weights, Measures, and Coinage" . . .	MR. GALE REW.
"Bibliotheca Devoniensis" . . .	MR. R. N. WORTH, F.G.S.
"A Literary Phenomenon" . . .	DR. R. OXLAND, F.C.S.
"Relics of the Stone Age at Staddon Heights"	MR. FRANCIS BRENT.

The first Conversazione, held on October 9th, 1879, was entirely of a scientific character. The following apparatus was exhibited and explained:

Harmonograph	MR. F. J. WEBB.
Phonograph	MR. R. N. WORTH.
Ice-Manufacturing Apparatus . . .	DR. R. OXLAND.
Remington's Type-Writer . . .	MR. F. J. WEBB.
Protectors of Telegraph Apparatus from Lightning	MR. WEBBER.

Mr. R. N. Worth read a paper on "Recent Geological Discoveries in the Neighbourhood."

The second Conversazione, held on January 8th, 1880, was devoted to the fine arts. A number of excellent pictures, in oils and water-colours, by local artists, were exhibited, and some first-class vocal and instrumental music was given by Messrs. T. E. and S. and F. Weekes, and Miss Marian McKenzie.

During the summer Field meetings were held; and these were so popular with the members, that your Secretaries venture to recommend that they should be continued during the ensuing summer.

The Curator of Fine Arts reports:

"During the past year several engravings of local celebrities have been presented by Mr. C. Skardon; and there is reason to believe that many pictures would be forthcoming if there were space to hang them."

The Curator of Geology and Mineralogy reports:

"The following specimens have been added to the Mineralogical Collection during the year—

"Arragonite, from Cattedown; chromate of iron, from Siberia; cryolite, from Ivigtot, Greenland, by Mr. F. Brent.

"Chiastolite, from Ivybridge; cronstedite (hydrous silicate of iron), by Mr. R. N. Worth.

"Calcite crystals in hollow nodule, from Peak Hill, Sidmouth; celestine (sulphate of strontium), from band of hollow nodules of lime in red marl at Peak Hill; gypsum (sulphate of lime), from red marl near Sidmouth; pseudomorphous crystals of chloride of sodium, from band in red marl at Salcombe Hill, by Mr. P. O. Hutchinson.

"The only additions to the Geological Collection have been—

"Phacops lævis, from Knowle Quarry, near Newton Abbot, presented by Rev. W. Sharman.

"Phacops granulatus, found by your curator in the shale which dips underneath the slate at a point about three miles east of Ivybridge (Mid-Devonian). The slab also contains a very fine eye of phacops, and is accompanied by the matrix."

The Curator of Botany reports:

"The number of botanical specimens in the Museum, obtained within the area of the two Western Counties, slightly exceeds six hundred. These are labelled and catalogued, and were, the greater part of them, collected by the late Curator, Mr. I. W. N. Keys.

"With the above are a number of specimens collected by Dr. Jacobs and the Rev. Mr. Hore many years ago, some of which have an historical interest; but many of them unfortunately have no data attached.

"There are also a number of specimens of British plants, but obtained outside the local area. These are unarranged, and have not as yet been particularly examined. Most of those examined seem to be in very fair condition.

"The local collection cannot as yet be considered more than a nucleus, as it probably does not comprise two-thirds of the species reported from the area, so that it needs to be largely supplemented before it can be considered a representative collection of the plants of the two Western Counties.

"The Museum contains also a copy of Mrs. Wyatt's *Algœ Damnoniensis,* Torquay, 1834 (4 vols. and supplement). Also a folio volume of Algæ, named, by the late Mr. Bosworva.

"Besides the above, the Library contains a bound folio fasciculus, comprising a set of Dr. Harvey's Australian Algæ, presented by the author, and a thick octavo volume of Algæ, collected by the late Dr. Cocks."

The Curator of the Library reports:

"During the past year many volumes have been added to the Library, among which are several works of interest and value presented by members and friends. The following have been so acquired:

"Presented by C. Spence Bate: 'Merk's Excavations at the Kesterlock, Switzerland.' Translated by J. E. Lee. Presented by F. Brent: 'Transactions of the Lancashire and Cheshire Historic Society,' vols. xvii–xxxi. (1863–79). Presented by T. R. A. Briggs: 'Journal of the Linnean Society,' vols. xii.–xiv.; 'Jones' Botanical Tour in Devon and Cornwall.' Presented by the author, C. W. Dymond, C.E.: 'Megalithic Antiquities of Stanton Drew;' 'Notes on the Men-an-Tol and Chywoon Quoit;' 'The Hurlers.' Presented by the Rev. Dr. Ewing: 'Journal of the Royal Society of Tasmania,' vol. i.; 'Proceedings of the Royal Geographical Society.' Presented by the author, J. D. Lewis: 'Pliny's Letters, Literally Translated.' Presented by the author, J. Brooking Rowe: 'Contributions to a History of the Cistercian Houses of Devon.' Also 'Hubner's Inscriptiones Britanniæ Latinæe;' Pamphlets—

'Affairs of England, 1646;' 'An Ordinance of the Lords and Commons, 1644;' 'Monck's Letter to Devon, 1660;' Nos. of 'Journal of Anthropological Society.' Presented by Rev. W. Sharman: 'Polwhele's Historical Views of Devonshire,' vol. i.; 'Fraser's General View of the County of Cornwall, 1794;' 'An Act for Establishing a Floating Bridge at Saltash Ferry, March 24th, 1832;' 'Report of a Committee for the proposed Bude Canal, 1818.' Presented by W. Square, jun.: 'Journal of the Royal Geographical Society' (7 vols.); 'Burton's Lands of Cazembe;' 'Proceedings of Geographical Society.' Presented by the author, R. N. Worth: 'Bone Caves of the Plymouth District.' Presented by W. Wyatt, Adelaide: 'The Native Tribes of South Australia;' 'South Australian Aboriginal Folk-Lore.'

"The following publications have been presented by the various undermentioned societies, mostly in exchange for the 'Transactions of the Plymouth Institution:' Belfast—'Report and Proceedings of Belfast Field Club, 1876–77, 1877–79. Berwickshire—'Proceedings of Naturalists' Field Club,' vol. viii. No. 3. Cornwall—'Journal of the Royal Institution of,' No. xxi. Devon—'Transactions of the Devonshire Association, 1879.' Dublin—'Journal of the Royal Society of,' vol. vii. No. 5, (1878); 'Journal of the Royal Geological Society of Ireland,' vol. v. new series, part 1 (1877–78), part 2 (1878–79). Edinburgh—'Transactions of the Botanical Society,' vol. xiii. part 3. Glasgow—'Proceedings of the Natural History Society,' vols. i. ii., and parts 1, 2 of vol. iii. Italy—'Atti della Società Toscana,' vol iv. fasc. 1. London—'British Association Reports, 1878–79;' 'Proceedings of the Royal Society,' parts 192–195; 'Journal of the Royal Microscopical Society,' vol. ii. (1879); 'Proceedings of the Zoological Society,' part 4 (1878), 1, 2 (1879); 'List of Animals in the Gardens of the Society, 1879;' 'Quarterly Journal of the Geological Society,' Nos. 138–41; 'Proceedings of the Geologists' Association,' vol. vi. parts 1–4, and index vol. v. Norfolk—'Transactions of the Norfolk and Norwich Naturalists' Society, vol. ii. part 5 (1878–79). Penzance—'Transactions of the Natural History and Antiquarian Society for 1852.' Somersetshire—'Proceedings of the Archæological and Antiquarian Society,' vol. iv. new series (1878). South America—'Archivos do Museu Nacional Rio de Janeiro,' vol. ii. (1877), vol. iii. (1878). United States—'Bulletin of United States Geological and Geographical Survey,' vol. iv. No. 3; vol. v.

2, 3; 'Catalogue of the Publications of Survey,' from Dr. Hayden; 'Smithsonian Report.' Winchester—'Proceedings of the Wiltshire and Hampshire Scientific and Literary Society,' vol. iii. part 2.

"The following have been purchased: 'Botany, Journal of,' vols. iv. v. vi. vii., new series; 'Buckton's Monograph of British Aphides—Ray Society;' 'Dyer on Ancient Modes of Bestowing Names, 1805.' Early English Text Society—'England in the Reign of King Henry VIII.;' 'Gennyrides,' part 2; 'Palladius on Husbandrie;' 'Sir Ferumbras;' 'Gesta Romanorum.' Folk-Lore Society, 1878—'Folk-Lore Record, 1879;' 'Henderson's Folk-Lore of the Northern Counties.' 'Lauder Lindsay's Mind in the Lower Animals' (2 vols.); 'Maclean's Trigg Minor,' part 14 (concluding one); 'Palæontographical Society,' vol. xxiii. with some older vols.; 'Sandford's Plymouth Guide;' 'Tunstall's Ornithologia Britannica.'

"Mr. C. Spence Bate has deposited a series of volumes of the 'Philosophical Transactions' in the Library, together with portions of the 'Transactions of the Linnean and Zoological Societies.' These works are for the use of members at the Library; but cannot be removed from it without the consent of the Council.

"The 'Journal of Botany,' and the publications of the Folk-Lore and Willughby Societies, have been added to the works for which an annual subscription is paid.

"There appears to be an increasing desire on the part of those not connected with the Institution to secure copies of its published 'Transactions' for their libraries."

FRANCIS BRENT, } HON. SECS.
JAMES C. INGLIS, }

ATHENÆUM, *25th March, 1880.*

TREASURERS' REPORT.

1879-80.

THE accounts presented herewith, although showing on the debit side an increase in two or three items, may be considered as satisfactory, and the adverse balance is rather smaller than that of last year. The old debt remains as before at £100.

SAML. CATER, } TREASURERS.
W. SQUARE,

Dated 1st April, 1880.

BALANCE SHEET

OF

The Plymouth Institution and Devon and Cornwall Natural History Society.

For the Year ending 31st March, 1880.

	£	s.	d.		£	s.	d.
By Annual Subscriptions, at 21/-	179	11	0	To Library	44	2	3
„ „ at 10/6	9	19	6	Lighting and Warming	11	4	11
Arrears of Subscriptions	4	4	0	Salaries and Commission	17	14	6
Donations	6	0	0	Interest	7	8	9
Rent of Hall	13	14	6	Repairs, Furniture, &c.	32	1	2
Miscellaneous	2	8	9	Taxes and Insurance	3	14	2
Balance	46	3	8	Reports	71	2	6
				Museum	2	10	6
				Conversazione	7	19	7
				Petty Disbursements	7	11	3
				Stationery, Printing, &c.	8	15	6
				Balance last year	47	16	4
	£262	1	5		£262	1	5
				Balance down	46	3	8

We have examined the foregoing Accounts and Balance Sheet, and have compared them with the Vouchers, and find the same correct.

(Signed) SAML. CATER,
W. SQUARE, } *Treasurers.*

(Signed) R. N. WORTH,
E. G. BENNETT, } *Auditors.*

Dated this 1st day of April, 1880.

An ABSTRACT from the METEOROLOGICAL REGISTER, from 1st January, 1879, to 31st December, 1879, kept at the Navigation School, Gascoigne Place, Plymouth (Lat. 50° 22½′ N., Long. 4° 7¼′ W.), by JOHN MERRIFIELD, LL.D., F.R.A.S., F.M.S.

MONTH.	BAROMETRICAL PRESSURE REDUCED TO MEAN SEA LEVEL AT 32° FAH.			TEMPERATURE.			HYGROMETER.				RAINFALL.		DIRECTION OF WIND AT 8 A.M.				
	Average Barometer	Maximum for Month.	Minimum for Month.	Average Maximum in shade.	Average Minimum.	Average temperature.	Average dry Bulb.	Average wet Bulb.	Average dew Point.	Average humidity Saturation, 100.	No. of days on which not less than ·01in. fell	Quantity for the month in Inches.	From N. to E.	From E. to S.	From S. to W.	From W. to N.	Calm.
1879																	
January .	29·952	30·360	29·302	41·19	32·15	36·67	35·58	34·55	32·95	90	15	5·71	17	3	5	4	2
February .	29·533	30·153	28·896	47·17	36·80	41·99	39·96	39·13	38·06	93	23	4·97	4	5	7	9	3
March . .	29·983	30·524	29·446	49·83	35·56	42·70	40·55	38·82	36·61	86	11	·44	12	1	8	6	4
April . .	29·669	30·314	28·750	52·97	38·63	45·80	44·18	42·10	39·65	84	18	2·79	5	6	6	7	6
May . .	30·032	30·512	29·438	56·59	44·03	50·31	49·53	46·59	43·44	79	20	2·22	9	4	7	8	3
June . .	29·776	30·148	29·425	61·78	52·15	56·97	55·61	53·95	52·37	89	25	7·11	1	12	14	3	0
July . .	29·843	30·189	29·410	63·77	53·77	58·77	57·24	55·66	54·20	90	21	4·31	1	6	16	7	1
August . .	29·843	30·083	29·548	64·84	55·49	60·17	59·01	57·39	55·95	90	25	5·74	4	4	13	6	4
September.	29·981	30·452	29·437	62·10	49·97	56·04	54·68	53·30	51·96	90	17	4·86	3	3	8	6	10
October .	30·125	30·495	29·551	57·43	46·61	52·02	50·75	49·31	47·81	90	11	2·19	12	1	5	2	11
November.	30·251	30·641	29·843	51·52	36·86	44·19	40·30	38·74	36·74	87	7	·56	11	1	2	5	11
December .	30·304	30·757	29·425	43·11	30·95	37·03	35·63	34·85	33·65	93	12	1·12	9	3	6	1	12
Average for 1879	29·941	30·386	29·373	54·36	42·75	48·56	46·92	45·37	43·62	88	205	42·02	88	49	97	64	67
Average for 15 Years . .	29·941	30·390	29·316	58·25	45·01	51·63	50·87	48·96	46·97	87	183·6	37·54	76·2	65·6	107.4	86·0	30·0

The observations are all made at eight a.m. The Rain Gauge is by Casella, and is 8 inches in diameter; its top 9 feet 2 inches above the ground, and 75 feet above the mean level of the sea. A rainy day is one in which not less than 1-100th of an inch falls. The instruments have all been supplied by the Meteorological Committee of the Royal Society, compared at Kew, and the index error supplied to each.

ADDRESS

AT THE OPENING OF THE SESSION 1879-80.

BY MR. J. BROOKING ROWE, F.S.A., F.L.S.,

President.

FELLOW-MEMBERS OF THE PLYMOUTH INSTITUTION;
LADIES AND GENTLEMEN,—

By your favour it becomes my duty, as it is also my pleasure, to commence the proceedings of the sixty-eighth session of this Society.

Since the beginning of last session, nothing calling for special remark in connection with the Institution has occurred. The work has gone on quietly, and I think satisfactorily, and no ground has been lost, either in this Hall, or in the Council Chamber upstairs.

During the past year, Literature, Science and Art have each had to deplore the removal by death of some leading votaries, and this Society erases from its roll of Members, the names of William Froude and Peter Holmes.

Of the life and arduous labours of the former, many accounts have been published. The Society did itself honour in electing Mr. Froude an Honorary Member in 1863, and it may be recollected that, in 1871, he delivered a lecture in this Hall, upon "The principles upon which a ship's sail-carrying power and steadiness in a sea-way depend," an abstract of which appears in the fourth volume of our Proceedings. The subject was treated, as might have been anticipated, in a most exhaustive and scientific manner, and the truths enunciated were illustrated by conclusive experiments, made with apparatus of an elaborate character.

In William Froude we have lost a man of world-wide repute, in Peter Holmes we have lost something more. We have lost one who was known to every member, one who has done the Society good service, who constantly lectured, who filled the office of Secretary for some time, and who was President in four several years. He was born in this town in 1815 (Jan. 18th.) He went to Oxford in 1837, matriculated at Hertford College, took his bachelor's degree in 1840, and was ordained deacon in the same year by Bishop Phillpots. In 1841 he was appointed Master of the Plymouth Grammar School, in November was elected a Member of the Plymouth Institution, and the following month a Fellow of the Royal Astronomical Society. I find that he gave his first lecture 8th December, 1842, the subject being, "Ancient and Modern British Church Architecture." In February 1843 he read a paper on "Colonization," and from that time he was a frequent lecturer. The titles of his papers were :—"The Affinity of Languages," "The Formation of the Modern Languages of Europe," "The Recent Discovery of Ancient Writings engraved on Rocks near Aden, and in various parts of Hydramaut on the coast of Arabia," "Shakespeare as a Poet," "Byron and Wordsworth," "Shakespeare ethically considered," "Moral Philosophy — some Modern Systems," "Shakespeare," "Recent advances in Science," "The Philosophy of Socrates," "The Philosophy of Plato," "High Art," "Classical Education," "India," "Epic Poems and Dramas of the Hindoos," "The Society for Promoting Social Science," "The Social Science Congress of 1857," "Homer," "The Death of Socrates," "Cotton," "Woman as delineated in Ancient and Modern Literature." In 1844 Mr. Holmes was elected Vice-President, an office which he filled, as well as that of Librarian, several times. In 1854 he was President, and again in 1859, 1873, and 1874. In 1855 he was Secretary, and at the time of his death was a Trustee of the property of the Institution. In his second year as President, he took his degree of Doctor of Divinity. He resigned the Mastership of the Grammar School in 1855. The list of his writings, mainly Critical and Theological, is a long one, and during the latter part of his life he was engaged in the translation of several books of the early Christian Fathers. For some little time before his death failing health, and the distance of his residence from the Athenæum, prevented his attending the lectures, but he took a warm interest in everything connected with the Institution, and was always zealous for its welfare. He died 9th October, 1878, and the then President, and many members, attended the funeral of one so much beloved and respected.

Although he was not a member of this Society, I cannot refrain from alluding to the great loss which literature (more especially archæological and topographical literature) has sustained in the death of my friend Richard John King. The simplicity of his character, and his singular modesty, combined with many amiable traits, endeared him to the somewhat restricted circle which was on terms of intimacy with him, and his readiness to impart to others any information sought, and his encouragement to perseverance given to those who were endeavouring to follow in the paths pointed out by him, were characteristics not always found, even in those interested in archæological research. He was born in Plymouth, and going to Oxford, graduated at Exeter College. Always studious, the work which he was compelled soon after leaving the University to devote himself to was not found irksome, and thousands have derived pleasure and profit from the writings of the author who preferred that his name should not be known to the world. He was always much interested in the work of this Society, and one of the last letters which I received from him was to thank me for a part of our *Transactions* which he had expressed a wish to see, and to congratulate all connected with the Society upon the production of what he termed a most valuable volume.

Art, too, records the death of another Devonshire man, Frederick Richard Lee, a Royal Academician up to 1871, when he resigned in favour of a younger man. He was well known to many in Plymouth, passing much of his time, between his numerous yachting voyages, in the town.

And yet another, Thomas Wills, Demonstrator of Chemistry at the Royal Naval College, a young man of great promise, who had already done much good work, although he had not attained the age of thirty at the time of his death in May last. He had recently been devoting himself to the application of chemistry to the manufacture of gas; and on questions connected with this subject he was rapidly becoming an authority.

I may also mention William Crabb, of Heavitree, an antiquary of no mean ability, and one possessed of much information connected with the archæology of Devonshire. His principal work is that on the Brasses of the County, published in the *Transactions* of the Exeter Diocesan Architectural Society. In these communications every Brass is described and very many figured, and the papers are very valuable contributions to local history.

And lastly, William Kingdon Clifford, a true genius, the most brilliant writer and probably the deepest thinker that this century has produced. Cut off at the early age of thirty-three, what he did was but a feeble earnest of what he might have accomplished. His fame of course rests, and will rest, on his wonderful studies in the higher mathematics, and not on the magazine articles which brought him more prominently before the general public. The way in which his abilities were speedily recognized, and the position promptly accorded him by Science, speaks well for the country, and proves that England will not be slow to render homage to intellect, and whenever it is found give it its proper due. Some of his lectures and essays have been recently re-published; and in the volumes edited by Leslie Stephens and Frederick Pollock will be found an essay which is remarkable in many ways. Mr. Pollock says that it was written in a single night, but that it is one of Clifford's best and most mature performances. It is in effect a reply to Virchow's objections to the teaching of the doctrine of evolution as a proved conclusion, and agreeing with his opinion that it ought not to be so taught, but for very different reasons,—Clifford deals with the German's main point—that the "missing link" is yet to be found. Clifford says that even if it was found, the discovery would not in any appreciable way add to the value of the argument, and reasons thus: That inasmuch as at one time life did not exist on the earth, the human race must have had a beginning within some definite time; that as it now exists, it must have originated, either from progenitors which differ from it very considerably in structure, or from non-living matter, or from non-existence; that no other supposition is possible. And then comes the question—Which of these suppositions is most probable, which of them is supported by most evidence, and which of them accounts for the largest number of facts?* Another book well worth careful reading is Clifford's *Seeing and Thinking*. Exeter is proud of her sons. William Kingdon Clifford is a man whom she may delight to honour.

The rapid progress recently made in every department of science, and the vast additions to literature, render it impossible to review in the most cursory way the advance made or the knowledge obtained, even in the course of a single year. It has been the custom lately for persons occupying the position I now do, from whom an inaugural address is expected, to confine their attention to one special subject with which they may be more or less intimately acquainted. I regret that on this occasion I am unable to follow such good examples, even at a considerable distance, and the remarks I propose to trouble you with this evening will be of a very desultory nature.

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* See *Pall Mall Gazette*, September 13th, 1879.

Plymouth is still without its public Museum. The Museum belonging to us does not by any means provide for the need. It is in many respects a valuable one, but want of space prevents the proper display of the collections; and the finances of the Society do not allow us to make the most of what we have, or to place the Museum at the disposal of the general public, as we should wish to do. I do not think that it is at all creditable to our town that it rests satisfied with the present position, and that it makes no attempt whatever to provide what would not only add to the enjoyment of the people, but be productive of the greatest benefit to all classes of the community. We want here a Museum which will illustrate, not only the natural history and antiquities, but also the art and manufacturing industries of the district. I need not point out to this audience what an ample field there is to draw upon for the formation of such a Museum. I go into towns with populations not a half, nay, sometimes not a quarter, as large as ours, and I find Museums provided, well cared for, and very popular among all classes. Of course I cannot compare Plymouth with the great towns of the north, with, for instance, Birmingham, nor would it be necessary to provide here the annual sum that Birmingham contributes for the support of its Museum, for there I understand the private subscriptions for this object amount to some thousands a year. And with what results? The average number of visitors to the Birmingham Museum is 300,000 per annum. And it is the same elsewhere. Wherever a Museum is established it becomes a source of profit and interest to numbers. No matter how careless the observer may be, no one can leave a Museum without carrying away something, without being benefited to some extent. And then the assistance to the sincere earnest worker! Think of James Whittaker, of Oldham. He once saw a piece of coal shale, and was told there was a fish scale in it. This he did not understand, and did not believe; but instead of continuing in his unbelief without further enquiry, as unbelievers generally do, he examined, was convinced, became interested, began collecting, and he—a hand in a cotton mill—devoted his early mornings and his late evenings to collection and study, and became a geologist. Not only did he make a good collection of fossils as he found them, but in order to ascertain the structure of coal plants, he made sections by rubbing the specimens down on the kitchen floor, then, cementing them to glass, ground them down again until suitable for the purpose. And further—it was necessary that he should have a microscope to examine what he had so carefully and at the expenditure of so much labour prepared. To purchase one was out of the question, but he was able to buy the lenses, and making the tubes himself, constructed an instrument which answered every purpose. Nor was the collection and examination of specimens by any means the end of this man's work. His collection of fossils, with another made by a friend of his under similar circumstances, furnished the materials on which Professor W. C. Williamson has to a great extent founded his admirable *Memoirs on the Coal Plants*, published by the Royal Society. And this is only one illustration out of many that might be adduced. And what have we provided, what has Plymouth done, to assist such a man as James Whittaker? What has she done to aid in work like this? All honour to the Plymouth Institution for having for so many years maintained with such funds the Museum it has, but little credit to Plymouth and the neighbourhood to allow it, now in the year of grace 1879, to remain the only one for the instruction of so large a population. This is a matter upon which I feel very strongly, and on which I am sure every thinking man will agree with me. The absence of such a Museum, and the reasons for such absence, furnish food for serious thought. They seem to indicate a want of appreciation, on the part of those whose business it is to provide for the well-being of those around them, of the responsibility of the positions they occupy.

A great step has been taken lately, and the success of the Free Library is now assured. This success was accomplished in spite of opposition, of which, as a Plymouth man, I am heartily ashamed. But the fact of the establishment of this Free Library should encourage perseverance in an attempt to secure a Museum with (for teaching is an absolutely necessary accompaniment) Science and Art schools attached. It is much to be regretted that some influential member of our local parliament does not take the matter up seriously; but I am much afraid that, judging from the hubbub which often greets any reference to the Free Library, such a proposal there would encounter an ignorant but serious opposition. Still the delay will be only for a time. The importance of local Museums is slowly, but at the same time very surely, impressing itself upon the public mind; and I do not despair that by-and-by some little light will dawn in this direction even upon the town of Plymouth.

I am not altogether sure that grants for the advancement of Science and Art from the Imperial Exchequer should be made to London, Dublin, and Edinburgh only. The attention of Government was drawn to this in 1877, and although Lord Sandon's reply was not perhaps satisfactory, yet he made a good point by showing that really the provinces were benefited also by these grants, as numerous articles from South Kensington of the greatest value were sent out from time to time. But for a great country like ours, the whole grant (and it includes not only the maintenance of Museums and Art Galleries, but also parks) is contemptible. Not, I suppose, altogether, half the cost of an iron-clad; and if it is a question between these and a ship of war, I think I know which is likely to be the most beneficial in the long-run.

It seems to me that there is just now an opportunity presented, such as may not occur at a future time, for providing a Museum in this town. Speaking for myself, and for some other members, but not committing the Society in any way, I think I may venture to say that if any properly-devised scheme for the erection of such buildings as I have referred to, with a certainty of their erection within a reasonable time, was brought forward, the land surrounding the Athenæum would upon certain, but not burdensome, conditions be available for the purpose. With the land provided and the aid afforded by Government, the amount required to be raised would be comparatively small.* Only let the matter be taken up seriously, earnestly. Such a place will pay itself a thousand times over; not perhaps in material wealth, although it may even exercise a power in that direction, but in increased intellectual wealth, in the education it would afford indirectly, in the more direct advantages it would give the seeker after truth, and the aid it would furnish to the student.

* Although saying this, personally I should prefer a very much larger site if it could be obtained.

But whatever is done must be well done. It must be a *good* thing. There must be plenty of space, plenty of room for development and increase. Let me briefly point out how I think such a Museum and Schools should be planned.* The basis should be of course local, but there should be also a thoroughly good typical Museum. This would not be necessarily extensive, but it should be made as complete as possible, so as to illustrate the more restricted fauna and flora, fossil and recent, which would constitute the chief part of the Museum, to the perfecting of which the energies of those having charge of it would necessarily be directed.

The departments would be—

1. Mineralogy, crystallography, and petrology, and the commercial relations of each should be illustrated.
2. Palæontology ; the fauna and flora arranged stratagraphically.
3. Botany. There would not only be the herbarium, but careful preparations in spirits and otherwise of fruits, seeds, and so on, would be exhibited. A cabinet of microscopical slides of the smaller species would be also necessary.
4. Zoology. This would be an important department, more especially with our extensive seaboard. It seems to me that a room devoted to marine zoology alone, properly arranged, would be a magnificent one, and one that would amply repay any labour that might be expended upon it. In connection with zoology would be the department of comparative anatomy—dissections, bones, internal structure, pathology.
5. Ethnological collections would follow.
6. Then Archæology, pre-historic and historic.
7. There should be an Aquarium attached for show and study.
8. And lastly, a working room with what are now known as zoological tables, provided with microscopes and instruments for biological students; and attached to this would be a Zoological Library, with works of reference.

The Art Gallery would be an altogether separate department. In addition to the permanent collection, the getting together of which would be a work of time, space should be reserved for the purposes of an Annual Exhibition of paintings by local artists, loan collections, and special exhibitions.

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* I have followed with some alterations the plan suggested by Professor Boyd Dawkins.

The Science and Art Department would include all the usual adjuncts—painting rooms, lecture theatre, class rooms, and laboratory.

Does all this seem beyond the reach of Plymouth? I trust not. Let us aim high, and we shall strike high. Let us set the right thing before us, and we shall get, if not all that we want and ought to have, a near approach to it.

Of course if we are content to permit things to remain as they are, to allow other towns with not a tenth part of our resources to be ahead and to keep ahead of us, if we neglect and despise the natural advantages with which we are surrounded, if we slumber on while others are up and doing, if we have no care for the proper training of those around us, or refuse to make some provision for those that are to succeed us, such considerations as I have urged, and arguments more weighty than mine, will be in vain. But I hope and believe better things. I sincerely hope that no more time will be lost, and that my successor, when he addresses you from this chair next year, will be able to congratulate you and the town on the progress of a Museum worthy of the neighbourhood, and worthy of the associations which cluster so thickly in and about these western counties.

Perhaps the most generally interesting topic discussed during the past year has been that of "Animal Intelligence." Of course the subject has been one of great importance to naturalists for a considerable time past, but it has recently acquired a new interest. It was brought before the public in a popular way by Mr. J. G. Romanes, in a lecture given during the Dublin meeting of the British Association, and later in another given by him in Manchester in March last; and for some months past an active correspondence *pro* and *con* has gone on in the pages of *Nature.* Quoting from the last-mentioned lecture of Mr. Romanes, "The great interest which in these days attaches to the study of animal intelligence arises from the importance which the subject has acquired in relation to the theory of descent; for when once this theory is accepted, as it now is by all competent persons, the science of comparative psychology, like the science of comparative anatomy, is placed on a completely new foundation. Groups of facts which previously seemed to be separated are now seen to be bound together in a most intimate manner, while the first principles of the science which have been hitherto unsuspected are now for the first time brought to light. No longer is it enough to say that such and such an action on the part of an animal is determined by instinct, and as such is beyond the reach of further explanation. Now the very thing to be explained is the character and origin of the instinct—the causes which led to its development, its continuance, its precision, and its use. No longer is it enough to consider the interests manifested by one animal as an isolated body of phenomena, devoid of any scientific meaning, because thus standing out of relation to any known or scientific causes. The whole scientific import of instincts as manifested by one animal now depends on the degree in which they are connected by general principles with the instincts which are manifested by other animals. So that just as in the science of comparative anatomy the scientific interest which attaches to the study of an animal body depends on the relations which the anatomy of the body presents to that of other animals, so in the now embryonic science of comparative psychology all the phenomena of mind as they occur in one animal would be almost destitute of scientific interest, unless they admitted of being compared with the phenomena of mind as presented by other animals. And in the one science, as in the other, the principle which infuses philosophical life into all these comparisons is that which is furnished by the doctrine of evolution."

I have quoted thus largely, because these sentences of Mr. Romanes show what is meant by the study of Comparative Psychology, and one which is just now engaging much attention. In his Dublin address he goes more fully into the argument.

He first refers to the principles of human psychology, and shows the three stages of perception—" 1st, That of immediate perception; 2nd, That of ideal representation of particular objects; and 3rd, That of a generalized conception or abstract idea of a number of qualities, which a whole class of objects agree in possessing," and divides the latter division into two sub-divisions; viz., "abstract ideas which are sufficiently simple to be developed without the aid of language, and abstract ideas which are so complex as not to admit of development without the aid of language." The first is illustrated by the necessity for food, which, while quite independent of language, is an abstract idea.

He then points out that all mental processes are accompanied by nervous processes, and shows the constitution of what has been called the "nervous arc," which leads to the conclusion that animal instincts may arise in two different ways, either from the performance of actions which were originally intelligent, but which by frequent repetition have become automatic, and, on the other hand, they may arise from survival of the fittest, preserving actions which, although never intelligent, yet happen to have been of benefit to the animals which first chanced to perform them. Psychologically there is a great difference between these, physiologically there is no difference.

Mr. Romanes then proceeds on to show that animals are able to form general conceptions or abstract ideas, and maintains that the intellectual operations of animals are indistinguishable from those of ourselves, and that having the faculty of abstraction they possess the faculties both of judgment and of reason; and he illustrates the latter by Dr. Rae's wonderful story of the Arctic foxes. In the emotions he shows that while they are slightly, if at all, developed in the lower orders, they are remarkably well developed in the higher, and asserts that the following give unmistakeable tokens of their presence: Fear, affection, passionateness, pugnacity, jealousy, sympathy, pride, reverence, emulation, shame, hate, curiosity, revenge, cruelty, emotion of the ludicrous, and emotion of the beautiful.

Now there is a book, published some little time since by the Rev. J. G. Wood, a very voluminous writer, who has not perhaps done any work which would be considered of real scientific value, but who has done more than any one else, excepting Gilbert White, to make Natural History popular, entitled *Man and Beast;* and in it, supported by numerous anecdotes, every one of which the author states is authentic, the emotions of animals are illustrated, whole chapters being devoted to memory, generosity, cheatery, humour, pride, jealousy, anger, revenge, tyranny, sympathy, friendship, and love. He also adduces illustrations of conscience in animals, which Mr. Romanes likewise dwells upon, by many remarkable anecdotes.

The correspondence in *Nature*, to which I have before referred, soon began, commencing with an anecdote of a water-rat climbing up a wall, by help of a shrub trained against it, thirteen feet high to a window sill, in order to partake of the bread which had been placed there for the birds; and this was followed by the now well-known story of the rats gnawing holes in leaden water-pipes to slake their thirst. Upon this the Rev. G. Henslow writes to question the truth of the story, and stating his opinion that brute reasoning was always practical, but never abstract; and goes on to illustrate what he means by adducing the conduct of a boy who found the straps of his skates frozen, when nothing but cutting suggested itself to him, and neither he nor his school-fellows considered that the ice would melt if he sat upon them for a few minutes; and deduces that "brutes and young persons are just alike in that nothing occurs to either beyond what the immediate fact before them may suggest." Professor St. George Mivart once said that an interesting book might be written upon the stupidity of animals, and Mr. Romanes said that an interesting book might be written upon the stupidity of savages, and I think that a still more interesting, and probably much more instructive, book might be written on the stupidity of so-called civilized man. A very short space of time might be covered, and, to go no further, recent events in the history of our town and country would afford ample illustrations. Anecdotes of all kinds, and some most convincing, then poured in, and in June Mr. Romanes summed up the evidence which he concluded proved that mental reflection existed without doubt in the lower animals; "that they possessed" abstract thought, "and that the phenomena of dreaming presented by several animals would seem sufficient proof that some animals at least possess a tolerably well-developed imagination." Very much correspondence followed of an interesting character, and it still continues; and to those who are unacquainted with the present position of the question, "instinct and reason," and who would like some pleasant and instructive reading, I would recommend the perusal of the articles and correspondence to be found in vols. xix. and xx. of the very valuable periodical to which I have referred. The long promised work of Dr. Lauder Lindsay, on *Mind in the Lower Animals in Health and Disease*, now shortly to be issued, will be read with interest, the object of the author being to show that mind in animals is of the same kind as in man, and that the lower animals are liable to the same varieties of mental defect and derangement as man.

For many years the *Encyclopædia Britannica* has been given to the world. Eight successive editions have been published; but until the issue of the last edition we should have looked in vain throughout the work for the heading Anthropology. The eighth edition was completed in 1860, and since that time Anthropology has risen to the dignity of a science, and has been deemed worthy of an article of thirty-one columns in the *Encyclópædia*, written by the president for this year of the Anthropological Section of the British Association, Mr. E. B. Tylor; and in addition a very valuable article, by Elie Reclus, on Ethnography and Ethnology. Except this article of Mr. Tylor's, and the Transactions, Proceedings, and other publications of the Anthropological Society and Institute, which were not very accessible, there was until very recently no treatise upon the general subject by any English writer; and it is only within the past few months that any work suitable for ordinary use was attainable in this country by those who were acquainted only with their own language.

Without assigning to the science such a remote date as some enthusiasts are disposed to give to it, the study of man as to his origin and in his physical and moral relations occupied the attention of philosophers at an early period, and the Pagan Censorinus in the third century, and the Christian Nemesius in the fourth, dealt with these subjects in two works, both of which were thought worthy of reproduction in the seventeenth and eighteenth centuries. Speculations of the wildest kind were promulgated, and the attempts to classify the principal races of mankind were weak and of course unsatisfactory; but still there was progress. Earnest thinkers were not satisfied with the theories which they were called upon to accept, and from time to time opinions were advanced which were anything but acceptable to the powers that were. Hear what Pope Zachary said, speaking of Virgilius, who evidently had been born a few centuries too early: "As to his perverse and wicked doctrine, which he utters against God and his soul, if it shall be proved that he assert there is another world, and other men beneath the earth, let a council be called by the Church, and let him be deprived of the sacerdotal garment."

In 1110 William de Conches, who, among other startling things, hazarded the suggestion, that as we inhabited the upper part of the earth, the lower part might be inhabited by other human beings, was put under the censure of the Church, and in consequence promptly disowned his opinions, which he had good reasons for supposing to be facts. In 1450 the antiquity of man was urged with much force by Samuel Sarsa, a Jew, but, like Servetus later, he paid the penalty, and was burnt to death.

The discovery of America gave a death-blow to the then orthodox views, and the belief in what has been called patristic ethnology was rudely shattered. But still progress was slow. The world had yet to learn, as it still has to learn, that the reign of truth is the reign of concord amongst mankind; that where truth reigns no disputes or discussions are possible, that every scientific question ought to be examined, even those which are most superstitious and most false, so as to recognize their just value, and to guard against being deceived by them.*

In 1721 Fabricius published his *Dissertatio Critica de Hominibus*, of which a second edition was issued seventeen years later, a remarkable book, not only on account of the curious information it contains, but as marking an epoch in the history of Anthropology. Strange to say, that although between the publication of the two editions of this work, Linnæus had sent forth his *Systema Naturæ*, Fabricius takes no notice whatever of it, and still continues his former argument, which was that universally believed up to the time of Linnæus, that man was a being *per se*, "the *chef d'œuvre* of creation, and to be studied only by physicians."† Linnæus compelled naturalists to accept man as a species, or genus, by putting him at the head of the animal world. From the time of Linnæus then it may be said that Anthropology dates. "Its object is the study of man as a *species*. It abandons the *material individual* to philosophy and medicine, the *intellectual* and *moral individual* to philosophy and theology." ‡

In spite of the censures of Blumenbach, Buffon, and others (and he had really done little to deserve them), Linnæus was not to be driven from the position he had taken up, and in 1746 he states his opinions more strongly, and writes:

"No one has any right to be angry with me if I think fit to enumerate man amongst the quadrupeds. Man is neither a stone, nor a plant, but an animal, for such is his way of living and moving; nor is he a worm, for then he would have only one foot; nor an insect, for then he would have antennæ; nor a fish, for he has no fins; nor a bird, for he has no wings. Therefore he is a quadruped, has a mouth made like that of other quadrupeds, and finally four feet, on two of which he goes, and uses the other two for prehensive purposes; and indeed to speak the truth, as a natural historian according to the principles of Science, up to the present time I have not been able to discover any character by which man can be distinguished from the ape; for there are somewhere apes who are less hairy than men, erect in position, going just like him on two feet, and recalling the human species by the use they make of their hands and feet to such an extent, that the less educated travellers have given them out as a kind of man. Speech indeed seems to distinguish man from other animals, but after all this is only a sort of power or result, and not a characteristic mark taken from number, figure, proportion, or position, so that it is a matter of the most arduous investigation to describe the exact specific difference of man. But there is something in us, which cannot be seen, whence our knowledge of ourselves depends—that is, *reason*, the most noble thing of all, in which man excels to a most surprising extent all other animals." *

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* Chevreul, quoted in Pouchet: *Plurality of the Human Race*, p. 9.

† Topinard.

‡ Quatrefages.

And to this opinion the great naturalist adhered up to the time of the close of his long and well-spent life.

Buffon had been working on the same lines as Linnæus, and had come to pretty nearly the same conclusions, and shortly before the publication of the *Systema* had issued his two volumes, and Daubenton, Blumenbach and Sœmmering, Camper and White, followed with memoirs upon a subject which was then interesting many, and which thenceforth was to become a study of the highest importance. Then came the reports of the great travellers, Byron, La Vaillant, Bruce, Cook, Barrow, La Perouse, Pallas, and others; and the struggle between the so-called classical and philosophical schools, the former headed by Cuvier, the latter by Lamarck and Etienne Geoffroy St. Hilaire, followed—a struggle which has continued ever since, and I need not say is not yet settled to every one's satisfaction. Those interested in Ethnology banded themselves together, and a society was constituted in the first year of this century, in Paris, under the title of the Society of Observers of Man, which did not last, in those stormy times, very long. The Ethnological Societies of London and Paris followed, but the scope of their operations was limited, and Anthropology as a distinct science was not thought of; but in the year 1863, mainly through the exertions of Dr. James Hunt, the Anthropological Society of London was founded, and in a very short time similar societies were started in almost every capital of Europe. Among these, the Societies of London and Paris doubtless occupy the foremost places. Our Society has done much good work, not only by the issue of its own Transactions in various forms, but by publishing translations of important works by foreign writers. The *Quarterly Journal* has now taken the place of the various Memoirs, Reviews, and other publications which have been commenced at various times, and after a while discontinued.

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* See "The History of Anthropology," by T. Bendyshe. *Memoirs Anthropological Society*, vol. i., to which article I am much indebted.

The publication of two books, issued, I believe, almost simultaneously during the last few months, ought to give an impetus to this important study. I refer to translations of the well-known book of Topinard, the curator of the Museum of the Anthropological Society of Paris, entitled *Anthropology*, and *The Human Species* of Professor Quatrefages, both very valuable books, and both, from the low prices at which they can be bought, accessible to all.

As would be supposed, the two authors take different sides. Quatrefages is a strong Monogamist, but at the same time is a strong believer in the great antiquity of the human race. On the other hand, Topinard contends earnestly for the doctrine of evolution (that great theory which solves so many difficulties), and thus in fact gets rid of the old question between monogenism and polygenism.

Let me strongly recommend the perusal of these two works to my hearers. They are both of high scientific value, and written with great ability. Topinard is more technical, but both are very readable. Besides these volumes, among the most recent contributions to the history of the race, I may mention the new edition of Keller's *Lake Dwellings*, in which is incorporated all the recent discoveries of the author, including the substance of his seventh report, and an account of every lake settlement examined up to the time of publication. Although the Swiss lake dwellings were the first to be described, and have thus acquired importance, it must be remembered that remains of similar habitations have been met with in different parts of the world, even, as General Lane Fox has pointed out, in the heart of London, in the peaty marsh where Finsbury now stands, and where in Roman-British times some outcast natives lived.* A great deal of valuable information will also be found in Moseley's *Notes on the Challenger.*

In April last an Anthropological Exhibition was opened in Moscow. This was promoted by the Imperial Russian Geographical Society, which largely contributed. We are so far without any details of this Exhibition; but from the short accounts it would seem to have been very successful, and will probably exert an important influence upon the progress of the science. The Czarevich sent a very valuable contribution, and large quantities of ethnological specimens, craniological and pre-historic collections, tumuli excavations, and articles of a kindred nature were brought together. All were arranged under the direction of the Secretary of the Geographical Society, and divided into six sections — pre-historical, anthropological, medico-anthropological, photographical, ethnographical, and the history of the Russian races. The aim of the exhibition was stated to be, firstly, To contribute to the development of Anthropology as a science; secondly, the foundation of an Anthropological Museum for the teaching of Anthropology in the University of Moscow; and thirdly, to popularize the science. There can be no question but that exhibitions of this kind will have the desired effect—the knowledge of Anthropology will be extended, and the study popularized.

Some of the communications made to the Anthropological Department at the recent meeting of the British Association were noteworthy. I may mention a paper by Dr. Hack Tuke on the Cagots, a despised outcast race, as you know, living in villages of their own in the south of France and adjoining countries. Their treatment has been abominable. Up to the time of the French Revolution they were compelled to live entirely apart from their fellow-men, in towns in separate parts, and in the country in villages of their own. They could do no work but the most menial, and they were obliged to wear particular clothing, so that they could not be in any way mistaken, and they had to enter churches by separate doors provided for them. The Revolution put them on a footing with other citizens, and the restrictions were removed; but they are still regarded as things only to be tolerated. It has been supposed that they are the descendants of the Visigoths, who, after their defeat by Clovis in the ninth century, remained in France, and their complexions, and hair and blue eyes have led to the impression that they were a distinct race. Dr. Tuke showed that the Cagots were not descendants of the Goths, and not a distinct race, but only a despised class among the people of the country. The present representatives of the Cagots are now only recognized by tradition, and not by their features, and are not distinguished by any peculiar mental or physical disorder, except when residing in an unhealthy locality. He then goes on to show that these outcasts have been such for a long period, that they are really the descendants of either, lepers labouring under a particular variety of leprosy, or affected with *leucoderma;* and many were doubtless suspected of leprosy in consequence of some slight skin affection. Here we have a very curious instance of a survival. What was supposed to be originally a sanitary precaution, as years went on developed into an unreasoning class hatred.

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* *Anthro. Review,* April, 1865; *Nature,* vol. xviii. p. 664.

African Anthropology was prominent in the proceedings of this department, and the papers of Commander Cameron and the Portuguese traveller, Major Serpo de Pinto, proved of much interest. The former gave a long account of the people of Urna (before referred to in his book *Across Africa*), a vast empire of Central Africa, governed by a king, who appointed chiefs to act in various districts under him and collect tribute. There was more trace of a centralization of religion in this nation than in any other known to Commander Cameron. The centre of the religion is an idol, held in such reverence that the people were afraid even to mention its name. It was kept somewhere in a jungle, but where the traveller could never find out. The king was mixed up with the cultus, and claimed and was accorded divine honours. Besides the great idol, there were a number of smaller ones, which were carried about and sold by the wizards, who, when they were consulted by the natives, put the questions to the idols, and obtained by means of a very poor kind of ventriloquism suitable replies. Caste was very clearly defined. No one was allowed to sit in the presence of the king except by permission, and no one of an inferior rank could sit if one of a superior grade was present. The natives part with their belongings with equanimity. The king at his discretion cuts off the hands, feet, ears, noses, and lips of his subjects, and the more a man or woman is mutilated in this way the more he seems to become attached to his chief. One of King Kasango's wives—he has a thousand only—offered to allow her ears to be cut off if the king would give her a slave. The slave was given, and the king cut off her ears as a matter of course, and the loss did not seem to trouble the woman. For the most part the people lived in huts on the land, but there were some strange exceptions. On one lake there were masses of floating vegetation, like that on the Nile which stopped Sir Samuel Baker on his second journey, and on this vegetation logs were laid, and huts built and inhabited. When it was wished to remove, the floating mass with the huts upon it was drawn to another part of the lake. On another lake there were two or three villages built on piles in the centre of the lake. Each hut was an independent habitation, but a number of them were always grouped together. When the king died all his wives but one were slaughtered, some being buried alive. Usually a stream was diverted, and a grave dug in its bed, and when king and wives had been buried, the water was restored to its usual course. But perhaps the most curious thing in connection with the Urnians was their method of signalling, so to speak, and communicating very rapidly, by means of drums. By certain beats on the drums messages could be sent immense distances in a comparatively short time, and answers speedily returned. This system of tattoo beating and drum communication was spoken of by some of the old travellers, and disbelieved; but Commander Cameron proves the truth of the story. The code of signals is carefully guarded, but while he was resident there he became sufficiently conversant with the taps given on the instrument to know when his own name or that of any other chief and many other matters were signalled. If he wished to visit a chief in a distant part of the country signals were given and passed along perhaps some hundreds of miles, and an answer was very quickly returned as to whether he should start or not. Expeditions were also regulated in their movements by the same means, and communications were made from head-quarters to all parts of the country. Commander Cameron also subsequently spoke of the people at Bibe, where the houses were well-built and square, and the interiors decorated with representations of processions and so on. The observer was careful however to explain that, although artistic to this extent, the dwellings were not by any means abodes of sweetness or light. He also met with a race apparently of white negroes, or rather white people with negroid features. These were found on a branch of the Tanginaki. Major de Pinto had also observed on the head waters of the Zambesi people with very light complexions, yet with features of the negro type.

Another communication was made by another Portuguese, the Count de Brazza, who had been recently travelling on the Gaboon and Ogowa rivers. He vindicated the Fans from the charges made against them by Du Chaillu, who formed his opinion after a visit of a single day. The Count speaks very highly of these people, from whom he received much kindness, and found them a generous, courageous people. He admitted that they were cannibals, that they ate their prisoners of war; but it was with them a religious idea, for they believed that in eating the heart of a brave man the courage of the eaten passed into and was added to the courage of the eater. This was followed by a strange discussion on cannibals and cannibalism. Major Pinto spoke of the wondrous bravery, loyalty and honour of the cannibal races, who were, he said, far higher in the social scale than the tribes by whom they were surrounded who were not cannibals. He had spent two years among cannibals, and the stories that it was but too common to relate about their ferocity and untrustworthiness were utterly untrue. Commander Cameron followed this up by saying that he always considered cannibalism one of the first stages of civilization, and that cannibals were always found to be enjoying a higher degree of culture than the non-cannibal tribes. He also stated that Livingstone's greatest friends were cannibals, and that the Maories of New Zealand, the bravest, finest race, were cannibals, and that cannibalism had generally been one of the stages of a race struggling for better things. Upon this, of course, the President (Mr. Tylor) could do nothing but suggest that after the glowing account of the loyalty, generosity, bravery, and other good qualities of cannibal races, it might be a question whether we should not feel it necessary to turn cannibals in the hope of sharing in these virtues.

The Count de Brazza also gave a sketch of a race, which he found scattered up and down among different people, the Akas—a dwarf race, in height from three to four feet only. They seemed to occupy the same relations to the people with whom they were mixed up, as the Jews and Gypsies do in Europe.

Papers and discussions on the antiquity of man also occupied the attention of the Anthropological Department. The most important of these were on the evidence of the existence of Palæolithic man during the glacial period in East Anglia. This was a communication by Mr. Sydney Skertchley, of the Geological Survey, and the proof was that from below tough undisturbed chalky boulder clay, at Brandon and elsewhere, the author had himself dug out various palæolithic implements; and the President, Dr. John Evans, Professor Boyd Dawkins, and others, acquiesced in the conclusions which the author of the paper had arrived at.

The microscope has aided research in a conspicuous way during the past year, but to this I can only refer very briefly. It is perfectly marvellous to think of the enormous number of microscopes made in this country, as well as in France, Germany, and America, and yet how comparatively few the workers really are. In many cases the instrument is used as a toy; in others it is bought because it is supposed to be the right thing to possess a microscope; in others some occasional real work is done; but while the former classes may probably be reckoned by hundreds, the latter are few and far between. But after all this is not to be wondered at; for a man or woman to do any really good work with a microscope there must be an amount of uninterrupted attention and consequent expenditure of time which many, however anxious they may be to undertake some investigations, are not at liberty to devote to it. Still it is impossible to overrate the value of the microscope, even when it fulfils but a little higher purpose than that of a plaything. It is impossible for anyone to look through a microscope without being the better for it, and while to those who are ignorant of nature's wonders surprise and a spirit of enquiry is raised, to the thoughtful observer a new world is opened, of which he had no previous conception. As the editor of the *Microscopical Journal* said, in the first part, issued now nearly forty years ago, "it cannot be a matter of surprise that many resort to the microscope as a means of intellectual pastime which is sure to terminate in beneficial results. General knowledge may be acquired by observation, recondite science by application alone, and the existence of the former, in the minds of the apparent tyro, by industry and perseverance, imperceptibly produces the latter."

Looking at the microscope as we now have it, an almost perfect instrument for the work for which it is designed, it is difficult to realize that it was not until the year 1824 that an achromatic objective was made in this country. Science was not slow to avail herself of the great help thus offered her, and every year has added to the number of discoveries of vast importance which have been made in every department of Biology by means of this grand instrument.

It may be in the recollection of some of my hearers that at the meeting of the British Association in this town, in 1877, the Rev. W. H. Dallinger read a paper before the Biological Section, "Researches on the Life History of the Simplest Organisms." This was a communication of great interest, and the results obtained being the outcome of much patient labour and delicate manipulation, the author obtained well-deserved praise. This year he was asked to deliver one of the popular lectures at the Sheffield meeting, which he undertook to do, but unfortunately illness prevented him carrying out his intention. In the paper to which I have referred—"Researches on the Life History of the Simplest Organisms"—he summed up the results of four years' careful work, some details of which had before appeared in the *Microscopical Journal*, by Mr. Dallinger and Dr. Drysdale. The life histories of six monads had been worked out. These monads are at present subjects of doubt as to whether they should be considered as animals or plants. "They are minute, free or fixed, rounded or oval bodies, provided with one or more long cilia, and usually provided with a nucleus and contractile vacuole."* The motions of these bodies, whatever they may be, are of the most graceful kind, and this motion, it seems, depends upon the number of the flagella or cilia, which range from one to four. The investigations showed that the life histories of these forms were perfectly complete, and definite; that when ordinary air was charged with given germs any nutritive fluid receiving those germs would produce monads, while if the air was kept perfectly pure, no monads appeared. Monads suddenly plunged into fluid of seventy degrees were destroyed, but if the fluid was gradually raised even up to 127 degrees, they not only lived but multiplied rapidly. The investigations were continued, and the next paper was read before the Royal Society, being the "Life History of a Septic Organism." The delicacy of the experiments was remarkable, the main work being done with a thirty-fifth objective, but a fiftieth was also employed, and inasmuch as the organism never exceeded one four-thousandth of an inch in long diameter, high powers of this kind were necessary. It is very curious to know that these minute organisms aid in getting rid of objectionable matter. The flagella are used as swimming organs, but the owner has the power of fixing in some way or other the trailing flagella to the ground, or decomposing mass, and by coiling them, "and bringing itself down upon the body to which it is anchored, and then suddenly darting up again, so as to make its flagella together the radius of a circle, it darts down on the decomposing substance," and by the enormous numbers that are thus engaged, the breaking up of the obnoxious tissues is accomplished. These organisms undergo fission or self-division, each dividing again and again.

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* Huxley.

In September last Mr. Dallinger published his paper on the "Measurement of the Diameter of the Flagella of *Bacterium termo*." Here it was also found "what Cohn had demonstrated, what Ehrenberg had suspected," and what the author and Dr. Drysdale had confirmed, that the movements of this species were produced and controlled by a pair of fine flagella, one at each end of its spiral body. Not only therefore in these bacteria was the cause of motion discovered, but there was the analogy of the monads, "many of them being only four or five times larger than the larger forms of *Bacterium termo*, these also being endowed with one or more flagella, suggesting the probability that all these forms depended for movement on similar mobile filaments."*

These careful investigators then proceeded, having succeeded in their endeavour to demonstrate these flagella, which both, after separate experiments had done, to measure the diameter of the flagella. Now to estimate properly the difficulty of this task it must be recollected that the average length of the bacterium is the one ten-thousandth of an inch. After referring to the mode in which the experiments were made, and speaking of a particular specimen which had a diameter of one-twenty thousand four hundredth of an inch, the author states that fifty separate drawings were made, and measurements taken with each of four lenses—$\frac{1}{12}$, $\frac{1}{16}$, $\frac{1}{25}$ and $\frac{1}{35}$ objectives—and the mean results obtained from the whole four sets of measurements gave for the value of the diameter of the flagellum 0·00000488526, which expressed in vulgar fractions is equivalent to the two hundred and four thousand seven hundredth of an inch nearly, that is to say, within a wholly inappreciable quantity. I give the conclusion in the author's own words: "Now if we suppose that as the method is only an approximate one, the errors are entirely on one side, which I know no reason for doing, and therefore in round numbers reduce this fraction to the one two hundred-thousandth of an inch, it nevertheless provides us with a fact of much interest, and indicates, as I believe, that an atom of semi-transparent structure, the one two hundred-thousandth of an inch, may become visible under proper conditions of illumination and general manipulation. How far this is the actual limit with transparent or nearly transparent objects I will not venture to affirm, but I am inclined to believe that it comes very near to it."

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* "*Transactions Royal Micro. Society*," vol. i. p. 170.

The interesting relations existing between flowers and insects are well known to all, thanks to the observations of Darwin and others, and the popular book of Sir John Lubbock; but the first record of a possible participation of animals in the fertilization of cryptogams has just been made by Dr. Dodel-Port, a Swiss botanist.*

In almost all non-agamic cryptogams the contents of the male cells are actively moveable, and when they quit the cells they move about freely in the water by means of the cilia attached to them, and so reach cells of the female plant, and fertilization is completed. "In the case of phanerogams, the independent mobility of the pollen bodies has become an impossibility. To effect the union of pollen grains with that particular part destined to receive them, in most plants, some external agent must interfere. In many cases, especially in the lower regions of the floral world, the wind, gravitation, or both together, are the agents in question; in the majority of the higher phanerogams, insects, or occasionally other animals, undertake the conveyance of the pollen. Now there are a great number of cryptogams in which the contents of the male cells, which are emptied into the water, do not possess the faculty of independent motion, as they are not endowed with cilia, and are therefore dependent upon the action of external forces for their locomotion. To these belongs the great and highly differentiated order of so-called red seaweeds or Florideæ, chiefly marine plants which vary much in form and colour, and which no one who has ever attentively observed on the sea coast will ever forget. Their antherozoids, which are generally spherical, are discharged into the water as motionless cells, and are yielded up to the play of currents in the same way as in our anemophilus phanerogams the pollen grains pass as a dust into the air, and are moved to and fro by the winds. There are many analogies between Florideæ and higher phanerogams regarding their sexual conditions. Thus among the former we find many species which are diæcious, similar to the lowest phanerogams among gymnosperms, and to others of higher order. The chances for fertilization in their case are therefore quite similar to those applying to diæcious phanerogams. Often the plants of the two sexes grow at a considerable distance from one another. In the spring of 1878 Dr. Dodel-Port, during a series of microscopical examinations of the red seaweeds of the Adriatic, extending over four weeks, found only female and agamic (tetrasporous) specimens of *Polysiphonia subulata*, T. Ag., and looked in vain for male specimens, of which at the end only of his investigations he could obtain a few. Their respective localities of growth were evidently considerably apart, and yet at all times Dr. Dodel-Port found specimens of the former in all stages of fertilization. The spermatozoids discharged by the male plants therefore found their way to the distant female plants in spite of their own immobility and general passive behaviour. The sea-water must therefore have frequently been in rapid motion.

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* *Nature*, vol. xx. p. 463.

These facts being ascertained, the thought easily suggested itself that possibly animals might take part in the fertilization, particularly as there is never a want of small marine animals roaming about in the Florideæ forests, such as—infusoria, crustacea, annelids, star-fish, and so on. But what particularly attracted Dr. Dodel-Port's attention, was the regular occurrence of innumerable bell-shaped animalcules (vorticellæ) in the shrub-like branches of *Polysiphonia subulata*. In the course of closer investigations of the phenomena of fertilization, Dr. Dodel-Port eventually arrived at the full conviction that in the case of *Polysiphonia* the little vorticellæ facilitate the conveyance of the antherozoids to the trichogyne, and that they act according to a natural law, in the same way as do the pollen-collecting bees, when by visiting the willow catkins they assist at their fertilization.

During a long series of investigations of the reproductive phenomena of *Polysiphonia*, Dr. Dodel-Port found regularly on the bushy thallus, and particularly upon the uppermost and youngest branches, an enormous number of vorticellæ which had settled there, and were as usual in incessant motion. Often they appeared in dozens in the field of the microscope, and from the constant vibration of their cilia, they were very troublesome, at least up to the time when the Doctor had directly observed their friendly co-operation in the fertilization he was studying. Numerous antherozoids were whirled round and round in the whirl caused by a vorticellæ, and frequently antherozoids came into contact with the trichogyne and remained attached to it for a longer or shorter period. It was entirely due to the motion caused by vorticellæ that Dr. Dodel-Port was enabled to follow the phenomena of the attachment of the antherozoids to the trichogyne from beginning to end. The motions of the vorticellæ are particularly varied through the repeated contractions of their stalks into short spirals, and thus they cause various currents in the water, by all of which the antherozoids are carried along, like any other small passive body that may be suspended in the water. The presence of numerous vorticellæ thus imparts to the passive antherozoids a kind of motion much resembling that of the sperm cells of other cryptogams which are endowed with active cilia. From this it follows with mathematical certainty that the probability of the antherozoid falling on the trichogyne in the presence of vorticellæ is immensely greater than that which would exist were there no animals present.

At present we have but a short account of this discovery, which has just appeared in *Nature*, translated from *Kosmos*, from which I have quoted, and further particulars are awaited with interest. Dr. Dodel-Port, in conclusion, says, "The total absence of active organs of locomotion in the antherozoids of Florideæ points to a common ancestor from which the different branches of the Florideæ have inherited the immobility of the antherozoids. No doubt that during the differentiation of the red seaweeds, many forms have died out in consequence of the fertilization not taking place through the passivity of the male cells, while other forms have retired to localities which, through active water currents, favour the process of fertilization in spite of the immobility of the antherozoids. It is well known that now we find most of the present species of the Florideæ on the coasts of warmer seas, which are constantly washed by the waves, while the northern coasts, which are covered by crusts of ice during a great portion of the year, are very poor in red seaweeds. Future researches will have to show how far in many of these aquatic plants the differentiation of the genera took place, in the sense of an adaptation to the small marine animals which inhabit them and favour their fertilization in the way I have pointed out. If many seaweeds, in their bushy, shrub-like thallus, harbour certain infusoria, bryozoa, hydræ, sponges, crustacea, annelids, and small star-fishes, and offer to them excellent hiding-places, or nourishment, so that these animals inhabit them with special predilection, then it is certainly possible that occasionally a correlation was formed, or adaptation took place, which was mutually advantageous, and which would find numerous analogies in the dominion of the multiple cross relations between the higher flowering plants and insects. In this sense I consider it my duty to submit to the criticism of biologists a point hitherto overlooked in the biology of red seaweeds, and bearing upon the explanation of the morphological differentiation of submerged aquatic plants."

There is no question but that this discovery opens up a new and very wide field for investigation and enquiry as to the mode of fertilization and reproduction in other genera of plants.

A very interesting piece of microscopical work is that of Mr. E. T. Newton, who in January last described to the Quekett Club a plan which he had devised for preparing a dissected model of the brain of an insect. The method was most ingenious. The brain properly prepared was carefully sliced up, and an enlarged drawing of each section was then made with the camera lucida, and these drawings transferred to pieces of wood proportionate to the thickness of the sections, and then cut out. By putting these slices of wood together a complete enlarged model of the external form of the brain was produced; and this can be carried still further by making drawings upon one side of the slices, and cutting them out like a dissected map. These being fitted together give models of particular parts. The structure of nervous centres now occupying some attention, I think that this very clever scheme will much assist observers, and enable them to observe position and structure in a way not hitherto attainable.

It would take me too long to refer, even in the most cursory way, to the work in which microscopists have been engaged during the past year. I would refer those interested to the pages of the *Journal of the Royal Microscopical Society*, this old Society having now its own journal. For many years its proceedings were published in the *Monthly Microscopical Journal;* but since the death of Dr. Lawson, the support of the Society having been withdrawn, this magazine has been discontinued. Science, however, gains; for the new journal is a most admirable production, and bids fair to become one of the most important of English scientific serials. This special subject is now well supplied; for we have in addition to this, the old *Quarterly Journal of Microscopical Science* and the *Journal of the Quekett Club.* I may add that the Royal Microscopical Society has done your president the favour of electing him an honorary member for his year of office, and the valuable *Transactions* are consequently sent him; and these he has the pleasure of transferring to the library, a course which it is hoped future presidents will follow.

In connection with microscopy I may mention the excursion of the Birmingham Natural History and Microscopical Society to the Cornish coast. This is the fourth excursion of this kind that this society has carried out. The party consisted of nine ladies and twenty-two gentlemen. A steam-tug was engaged, the head-quarters being at Falmouth. Dredging, botanizing, and geologizing went on daily, and the result was that large collections were made, which are now being examined, and will be shortly reported on. It seems to me that this kind of work is very satisfactory, and must benefit, not only individuals, but science generally; and the example of our northern friends is well worthy of imitation.

I have before referred to some of the proceedings of the British Association. The meeting was a small one, and presented no special features of interest. In the department of Section D, Biology, beyond those I have mentioned, no papers of any considerable interest were read. The address of the president, Professor St. George Mivart, was noticeable as showing the great obligations science owes to Buffon, and contrasting the work accomplished by him, but not in any spirit of rivalry, with that done by Linnæus, as set forth by the president of last year, Professor W. H. Flower. The address of the President of the Association, while containing perhaps few, if any, new facts, was a masterly arrangement of our knowledge of life, or, to, use his own words, an "account of the most generalized expression of living matter, and of the results of the most recent researches into its nature and phenomena."

The weak part of the address, it is generally considered, is the statement made with reference to *Bathybius Haeckelii.* It is said that after the parent of *Bathybins* had disowned it as his offspring, and after the expressed opinion of the *Challenger* naturalists that the supposed living organism was only a chemical deposit, no use should have been made of it as illustrating an address of such importance as that of Dr. Allman. But all that the President said was, that after the very elaborate investigations of Huxley and Haeckel further arguments were needed before observations so carefully conducted should be deemed to be altogether fallacious. I think too that there was some little fun intended, and that the naturalists who followed Professor Huxley, and verified, as they said, his experiences, and adopted his conclusions, were being turned into ridicule.

There have been recently many important additions to Zoological literature.

Two or three volumes of the publications of the *Challenger* Expedition will now soon be ready, and I may bring to the notice of those who are not already acquainted with it, the most fascinating volume that has been published for many years, and one that will rank worthily with such books as White's *Selborne*, Kinglake's *Eöthen*, and *Darwin's Naturalist's Voyage.* I mean Mr. Moseley's *Notes by a Naturalist on the Challenger*, a book I have before mentioned, and one well worthy of the high scientific reputation of the author, and written in so pleasant a style as to make it interesting to every one.

It is many years since the first edition of Yarrell's *Fishes* was published, and, although it was succeeded after a long interval by the work of a much more competent man—I mean the late Jonathan Couch—the earlier book has always kept its place. The last few months has seen the publication of a fine work on the Fresh Water Fishes only of our country. It is by the Rev. William Houghton, and it is the most complete monograph in our language. The author gives twenty-three species of that difficult family the *Salmonidæ.* Yarrell, in his first edition gave, I think, fifteen, and Mr. Couch, whom I recollect saying somewhat peevishly while he was writing his book, that he thought he should be obliged to make twenty species, eventually included twenty-four. Mr. Houghton's work is beautifully printed and illustrated, and the only objection to it is that it is somewhat costly.

The history of the *Birds of Europe*, by Mr. Dresser, which has been in course of publication for many years past, is now nearly completed. It is a book of high scientific value, and will be the standard authority for a long time to come.

Mr. Newton's edition of *Yarrell's Birds*, really a new work, is progressing very slowly. The author cannot keep pace with the mass of material he has accumulated, and as he said to me a few weeks since, if he could print all he could write he should soon have finished, but the difficulty is to compress and arrange.

In conclusion, let me say a few words as to the main objects of this Society, as I understand them, and what should be the aims of the members, and of the Council which the members annually appoint. It is pretty well known, I think, what my opinions are. While I am by no means anxious that other subjects should be excluded, I think that special attention should be directed to the investigation of subjects which have relation to the History, the Literature, the Science, and the Art of the counties of Devon and Cornwall. There is still a very great deal to be done in this direction, and the primary work of the Institution should be local. During the years that have passed since this Society was founded, the needs, the belongings, and the characteristics, of the provincial town have altogether changed, and the opportunities for acquiring information as to progress generally, have increased to a remarkable degree. There are now so many channels by which communications of any kind, having a general interest, can be conveyed to the public, that it does not seem right to encroach upon the small funds of a Society such as this, for the purpose of giving them, however valuable they may be, to the world. Things are now vastly different from what they were even in 1830, when the first volume of our Proceedings was published, and yet it is very evident that the Council at that time was anxious to give prominence to papers, the main interest of which was in their local character. And the wisdom of such a course is now apparent. That volume contained nine articles. Three of these, relating exclusively to Devonshire, I do not hesitate to say were of the greatest importance, and have led to results which were little anticipated by either their authors, or the Society by the agency of which they were published. I refer, of course, to the papers by the late John Prideaux, Edward Moore, and Samuel Rowe—names always to be received within these walls with honour and respect. The papers were on the "Geology of the Neighbourhood of Plymouth," an essay of considerable value, one often quoted and acknowledged, and perhaps still oftener made use of without acknowledgment; on the "Birds of Devon," a contribution to the local fauna when investigations of the kind were rare, and which evidenced not only an intimate acquaintance with that portion of our Natural History, but, for it appeared before Yarrell's *History of British Birds*, also a clear idea of scientific arrangement which made it at that time a model list; and lastly "The Antiquarian Investigations in the Forest of Dartmoor," which led to further researches, and eventually to the publication of the *Perambulation of Dartmoor*. We have, therefore, a good precedent to follow. It says much for the wisdom of our predecessors, who at a time that matters relating strictly to a particular locality did not receive the attention they have since, gave such prominence to these papers.

Devonshire just now requires especial attention in this direction; for while in Cornwall there is more than one Society which publishes *Transactions*, in this county besides our own there is only one, the finances of which are taxed to the uttermost in printing the various communications—not all perhaps of equal value, but all worthy of preservation—which are made at its annual meeting.

I said just now that there was no difficulty in giving to the world papers which related to general subjects, and that a Society such as this ought not to be burdened with the cost entailed in the publication of what was not strictly local. The daily newspaper, the weekly journal, the monthly periodical, among which may be mentioned as the most valuable, the *Contemporary Review*, the *Nineteenth Century*, and the *Fortnightly Review*, are channels available among others for this purpose. Papers which now find a place within the covers of these, in former times had no chance of being brought to the knowledge of the many, save through the agency of societies such as ours. And it is the same with the general work of the Society, and it does not, I think, altogether fulfil the mission which was had in view when it was established. In 1812 there was nothing answering to the periodicals to which I have referred; the newspapers were,—well not what they are at present. True there were some newspapers, and there was also the *Gentleman's Magazine*, and the *Quarterly* and *Edinburgh Reviews*, but they were expensive, and the reading of them was confined to the few. The weekly essay from the desk at the other end of the room was therefore heartily welcomed, and the Thursday evening which produced it anxiously waited for by many. Now, however, not only do numerous excellent publications supply the pabulum to many, but other efforts of a kindred nature tend to keep people at home on winter nights, and it is with some reason that they ask why they should leave their firesides to listen to a paper, while they can read one at home without any trouble, of equal interest, although not perhaps on the same subject. I do not lose sight of the discussions, but unless the main subject attracts, the discussions in themselves will not. I think the remedy for this is to deal with local subjects in which most are interested, and information with respect to which is not generally attainable; and if our energies were concentrated upon these, a good and permanent work will be done. There is much to be done yet to complete the history of the two counties both as regards their history in the widest sense of the word, and in their geology and biology, to say nothing of other matters connected with their social and commercial relations. For example, to take history, what is really known of this part of England before the Roman invasion? The information must necessarily be scanty, but still much is to be collected. And it is the same with regard to the Roman occupation. A fine field is open to any one who will take up the period between the withdrawal of the Roman armies and Senlac; and again the period covered by the wars of the Roses—the latter time being almost a blank, so far as any facts connected with the history of the West are known to the public. In fact, without going further, I shall not be far wrong in saying that the history of the western counties, both historically and topographically, has yet to be written. This may seem a bold statement, but to any one who doubts it, I would refer to the recently completed work of Sir John Maclean, and compare it with such a book as Lysons' or Polwhele's. Lysons' *Devon* professes to deal with the whole of the county of Devon and the parishes in it. Sir John Maclean's *History of the Deanery of Trigg Minor* comprises seventeen parishes only. The former is in two quarto volumes not very closely printed; the latter occupies three thick quarto volumes, and is a model of what a parochial history ought to be. And in natural history, although much good work has been done, much still remains to be accomplished, more especially as regards the lower forms. There is plenty to do; all that is wanted is persons to do it. This Society offers to such persons a helping hand and a hearty welcome. It should be a focus of energy. Here the traveller in the paths of science should be cheered and encouraged and assisted; here the student should be able to obtain information, which the want of renders his studies difficult and his acquirement of knowledge slow. The terms of membership are suited to every one; and here let me say—for I think there is a disposition with some of our members, not less anxious, I am sure, than any of us for the welfare of the Institution, to forget it—that there are three classes—Members, Associates, and Junior Associates. Very wisely these have been kept quite distinct. The lecturing members are those upon whom falls the burden of carrying on the work of the Society. They are those who, interested in its progress, and expecting to be permanent residents, at all events within the sphere of its operations, undertake certain responsibilities in connection with the Society. From them the Council is elected, and there is a set of laws for their guidance. One of these laws states that no candidate is eligible for election unless he will undertake, if elected, to abide by the rules, and give an annual lecture when called on so to do. That he is a person who will thus assist the Society and do his best to carry out the objects it has in view, is vouched for by the three members who must sign the recommendation that he be elected. The undertaking given by the candidate is a serious one, and by no means a mere formality. Everyone seeking to be a member and, signing it, is of course morally bound to fulfil the obligation entered into, and to observe the law, and lecture when requested. Were it otherwise, a Society constituted as this is could not go on. Associates are no less useful to the Society in another way, and are those who for various reasons are unwilling to enter into the obligation referred to, but who by their presence among us, by contributing their annual subscriptions, and by joining in the debates, give assistance unquestionably valuable, but without responsibility. The junior members, who in time will develope into senior ones and lecturers, we are always glad to see in this hall. The lecturing members will heartily welcome as their companion any one desirous and willing to assist in the work we have in hand. All that is asked of him is, that he will do his best to aid his fellow-members in their work in his turn; that he will willingly and unhesitatingly take his place at the desk opposite, and communicate to others what knowledge he may be possessed of.

The Society has pursued a somewhat chequered course since 1812, but its claims as an important local Society have always been recognized; and even when its numbers have been reduced and its finances crippled, it has never done anything to forfeit the good opinion of its friends and neighbours. If good work in the past can be looked back upon, let us resolve that the work before us shall be also well done. From the very position the Institution occupies, responsibilities are entailed upon those who are charged with the duty of carrying it on. In the commencement of this address I indicated an organization which the town and its inhabitants sorely stand in need of. We have made one attempt; can we not once more try again to do something in this direction? We can but make the effort. If the apathy or something worse, of those who ought to assist again baffle us, still the attempt will have been made, and we can but fail. But, on the other hand, if we succeed great will be our reward.

LEISURE.

SYLLABUS OF LECTURE BY MR. R. COLLIER.

(Read October 16th, 1879.)

THE importance of leisure; riches and leisure do not always go together; some varieties of the idle rich and the idle poor compared; distinction between the sexes in the matter of the employment of leisure; manual employment soothing to the brain; recreations of distinguished men; importance of previous hard work to the complete enjoyment of leisure; some varieties of men of leisure; the pastimes of Englishmen and foreigners compared; different kinds of work require different kinds of leisure; Alpine climbing; foreign travel; newspaper correspondents abroad; people who are above their work; some reflections on eminent men; variety of employment desirable; tendency of the course of events.

DARWINISM.

ABSTRACT OF PAPER BY THE REV. W. SHARMAN.

(Read October 23rd, 1879.)

THE lecturer limited the scope of his address to sub-human forms of life. The theory commonly known as Darwinism taught that all the species of animals now living on the earth were results of the gradual modification of pre-existing species by inheritance and adaptation to changed conditions of life. The doctrine it opposed was the old, unscientific theory of Creationism, which asserted that every distinct species was the result of a distinct act of the Creator, introducing some new element, or more fully developing what already existed. According to this theory the chain of animate life was a mere mechanical thing, every link having been forged by a distinct act of the Creator's will. According to the evolutionist, each link was an organic "part of one stupendous whole, whose body Nature is, and God the soul." Each later link had grown out from an earlier one, and implied a necessary predecessor. Both dogmas were hypothetical, but in a different sense. The dogma of Creationism was a *mere* hypothesis, whose assumptions were in conflict with biological and geological facts. Indeed, the theory of evolution owed its inception in a large measure to the observed insufficiency of the hypothesis it replaced. Darwinism, unlike its rival, was suggested by observation, accorded with fact, and had in at least one splendid instance been verified. The evolution theory originated in observations made by Mr. Darwin during the scientific expedition sent out in the *Beagle*, relative to the geographical distribution of animals, which seemed to throw some light on the origin of species. On his return he began to accumulate facts and make experiments, and in 1859 he felt himself justified in putting forward the hypothesis "that existing forms of life are descendants by true generation of pre-existing forms." The world of animal life shows us the operation of two great laws—the law of inheritance, and the law of variation. Controversy began with the question, Would these laws explain the origin not only of varieties, but of species? Darwinism answered the question in the affirmative. An example, quoted from Mr. Darwin's works, was the multitudinous varieties of the tame pigeon, many of which the ornithologist would classify as separate species if they were shown him as wild birds. What man had done in a few instances and in a few years, Darwin believed that Nature, working through immeasurable ages, and amid frequently and widely varying conditions, had done in many instances. The means by which such stupendous changes had been brought about Darwin formulated and named as natural and sexual selection. To the argument that the time required for the effects attributed to evolution was immensely greater than physical philosophy would place at our disposal, and the conflict between Sir William Thompson and Professor Huxley as to the period for which the earth had been fitted to be the abode of animal life—he said, they were sure of their facts; and when the geologist and the physicist had fought out their battle, and not until then, the evolutionist would be able to say whether the process of evolution had been slow or rapid. One of the most formidable objections to the Darwinian theory was founded on the absence of fossil remains of connecting links. The answer was twofold. In the first place the geological record was so imperfect that it could not possibly be called on to supply a complete life history of the earth. It was like a work in one hundred volumes, the first fifty-four of which had been burnt, while half the remainder were out of their reach, and those they could get at had lost more than half their pages. The earlier sedimentary rocks—the Laurentian group, attaining a thickness of 30,000 feet—had been so changed by igneous action that only one fossil, and that a disputed one, had been found in them, though the presence of graphite gave a strong hint that organic life was abundant when the rocks were formed. In a few instances, however, where the record had been preserved for a considerable period, the evidence was wholly in favour of evolution. The lecturer illustrated his statement by numerous instances, the most important of which, by the aid of a series of diagrams, went to prove the evolution of the horse. The horse, he said, was an extreme modification of the general mammalian plan, deviating widely from the common structure of mammals, and showing very obvious signs of being a special creation; and it had been urged that if the evolutionary theory was true, the intermediate forms between the horse and the lower mammals ought to be produced. Confining himself to one strongly-marked divergence—the one toe of the horse compared with the five toes of the general mammalian fore-arm—he said that for many years the evolutionists were unable to produce the record of the intermediate changes, the only facts in support of the theory being that foals were not unfrequently born with three toes, and that the rudiments of two toes were visible in the skeleton of the horse's foot, the "splint" bones. Within a recent period, however, American geologists had discovered a series of fossil horses leading up to an animal with four toes and a rudimentary fifth. Huxley said if that was not scientific proof there were no merely inductive conclusion that could be proved. In conclusion, the lecturer acknowledged that Darwinism could not be received without great mental disturbance. It would cause the recasting of many forms of thought; yet not the less the foundations would endure. No principle dear to mankind would perish. But the imperfection that suggested doubt would cease to do so when it was viewed as a mere temporary phase of an evolution still in progress, that through the better reached ever to the best. And the fairness of the world would be more fair, and its promise more splendid, when we regarded it as a but half-opened bud, whose fragrant regal flower, and still more royal fruit, were yet to come.

PASTURES OF THE SOUTH-WEST;

OR,

The Meadow Lands of Devon and Cornwall.

ABSTRACT OF PAPER BY MR. T. A. CRAGOE, F.R.G.S.

(Read October 30th, 1879.)

PERHAPS nowhere in the world can the meadows of Devon and Cornwall be surpassed. Beautiful and bountiful, they crown the gentle slope, or stretch away over long-drawn vistas of valley and champaign; exhibiting, from the peculiarly broken and rolling formation of the land, a variety of aspect unrivalled. There are meadows round Milton Abbot, Tavistock, Wadebridge, and Truro, that will feed cattle as fast as the rich deep feeding-grounds of Leicester, Cheshire, or the Vale of Evesham; faster, in a wet summer, than the plains of Normandy or flats of Somerset; and always faster than the green pastures of County Cork, so rich in dairy produce.

Among the grasses which compose our pastures, the first in season is the Sweet Scented Vernal—*Anthoxanthum odoratum*. This is the earliest British grass, putting forth its tender foliage whilst the biting winds of March are still abroad; thus, as an early pasturage for ewes and lambs, it merits much attention from the farmer, flowering a full month earlier than the Ray or Rye grass, which is so much depended on. It should, however, be cropped early and close, as its herbage becomes somewhat hairy and dry when approaching maturity, a period generally attained by the first week in May, when other grasses are just beginning to grow. This grass is the only one of its species frequenting British meadows, and, save one, *Bromus Diandrus*, the only grass in class Diandria peculiar to this island. In the south-west of England, mixed with *Holcus* and Cocksfoot, it falls fresh before the scythe far on in June, and here, whatever may be the case elsewhere, there is virtue in the old report, ascribing chiefly to Anthoxanthum the grateful perfume of our hay-fields, given off powerfully whilst drying, as anyone may know by carrying a few spikes of Sweet Vernal in the pocket for a day or two.

The smooth-stalked meadow grass, *Poa pratensis*, is early, rich, and good; rather affecting the upland pasture, and consorting in some counties with Sheep's Fescue. It depends mainly on a creeping root, sheds little seed, and where once established becomes an abiding plant.

Not so the rough-stalked meadow grass, *Poa trivialis,* delighting only in moist meadows, where it depends more on seed yielded in abundance, and goes off sometimes after being cut. This excellent grass is called in Lombardy, "Queen of the Meadows." The slight difference between the two last-named species is chiefly marked by the stipule or ear-lobe of the leaf, which is inclined to become acute in *trivialis* and obtuse in the smooth-stalked variety. Though both these grasses are common to Devon and Cornwall, I have never found them to form in any marked degree the staple of our pastures.

Everyone has noticed the Flote Grass, *Poa fluitans*, trailing over the pools which so often adorn our picturesque, deep, and winding west-country lanes, but all are not aware what a valuable winter grass this pond weed is. In Berks and Wilts, lands have been laid under water to foster the growth of this floating meadow or manna grass, for early spring requirements, and well it should be so, for when "winter lingers in the lap of May," green herbage is priceless. The seeds of this grass, constituting the manna of commerce, are especially large and well esteemed in parts of Poland, Holland, and Germany; and in British streams they are the sweet morsels of geese, ducks, and even trout.

That universal weed and juicy grass, *Poa annua*, never forms in our west-country meadows the entire floor, as it sometimes does in Suffolk, where it has been especially cultivated.

On the Fescue grasses we will not dwell long, because they enter but slightly into the warp and woof of our feeding-grounds.

Festuca duriuscula rarely enters, so far as I have seen, into the sward of the south-west. In arable lands in some upland counties it becomes a detestable weed, known to the rustics as "Black Couch." That harsh and hungry grass, *Festuca pratensis*, is certainly not abundant in our pastures. From its drought-resisting properties, Meadow Fescue has been strongly recommended. The Spiked Fescue, *Festuca loliacea*, was long supposed to be a hybrid between *Festuca pratensis* and *Lolium perenne*, manifesting a certain similarity in spike and foliage to both; and it is noted for non-perfection of seed. Few grasses outrival the Spiked Fescue for quantity and quality, and our farmers may wish for it more abundantly in their pastures.

This brings us to another and still more important grass, which I have found very shy of the pastures of Cornwall; namely, the Sheep's Fescue, *Festuca ovina*.* I believe it rarely forms any considerable share of our upland feeding-grounds. The chalky hills of England are the favoured habitats of *Festuca ovina*, and no doubt that will account for its general absence from our enclosures.

Beside the Fescues already named, there is one that should not be passed over lightly. Though rarely intruding into our pastures, it is perhaps the most conspicuous tenant of the hedgeside, indeed it is there universal, and certainly of some use in affording a share of winter forage to out-door cattle. This is the Hedge or Wood Fescue, *F. Sylvatica* of Hudson, Withering, Relham, Sibthorp, Martyn, Dickson, and Knapp; whilst in the *Transactions of the Linnæan Society* we find it classed as *Bromus sylvaticus*. De Candolle has made it a *Triticum*, and in Grey's "Natural Arrangement" it finds a place as *Brachypodium Sylvaticum*.

Perennial Darnel, Ray or Rye grass, *Lolium perenne* of the Species Plantarum, is found in every pasture in the two counties, and as an early sweet grass it is, and long has been, a favourite with the farmer. It was the first grass cultivated as a field crop in this country, and for a long time the only grass seeds bought and sold were those of perennial Rye. From Norfolk county it went broadcast over the kingdom, and farmers little thought they were buying the seeds of a weed growing in every pasture.

There are only two grasses more of this family, *Lolium temulentum*, and its close congener, *Lolium arvense*, both common in South Wales, and both, I believe, rather uncommon in Devon and Cornwall.

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* This grass is abundant all over Britain in rough pasture land.—Ed.

We now come to one of the most striking grasses in our west-country pastures, and by our roadsides; namely, the Cocksfoot, *Dactylis Glomerata*, a tall handsome plant, especially when in flower, throwing up a profusion of radical foliage, and rooting deep down in the soil. This is the orchard grass of North America, and in the orchards of the south-west, and all through the kingdom, it is most abundant—a heavy cropper, and growing after the scythe faster than any other. Its abundance and hardihood makes it a staple winter grass in brakes, copses, and coarse orchards, affording grateful herbage to cattle grazing in such places.

One of the very best sheep grasses in Britain, and one growing on every hillside west of Exeter, is the Crested Dogstail, *Cynosurus Cristatus.* In some parts it is said to associate with Hard Fescue, and the two together form a first-rate feeding-ground; but I have never known it so associated in Cornwall.

Perhaps the most universally conspicuous plant of all in our thick-floored meadows is the Meadow Soft Grass, *Holcus lanatus*, known in the North as "Yorkshire Whites." Its silvery-purple panicle becomes much divaricated as it matures.

This particular grass has long been held in light esteem, but more perhaps by the closet naturalist than by the practical farmer, who, watching his herds as they feed, and his pastures as they grow, sees that Meadow Soft Grass abounds in his very best home floors of bullock land. Where the ox bites there will come the grasses most suited for his food, which is one of the most admirable arrangements of Providence. True, cattle may not affect this species so much as some others; but regarding the above fact who can doubt that it forms the *piece de resistance?*

The older writers and most men of letters have urged the vital necessity of having good seeds to start a pasture. Good seeds are valuable, and the farmer will always sow the very best he can get; but he knows at the same time that good seeds mean less than good treatment, and to manure well and graze close are the two prime laws which rule all pastures. Take a piece of fallow ground, drop never a grass seed, but let cattle stray around occasionally, and lay on the manure, and in a season or two you will have a pasture fit for the White Bull that bore off Europa. From thence will gradually disappear all weeds and weedy grasses. Couch grass will go, Black Squitch will go, all the coarser herbage will die out before this stamping and manuring; and there will gradually come the most excellent Poæ, the sweet Clovers, the Crested Dogstail, the Cocksfoot, and the Woolly Holcus, or Meadow Soft Grass, without one seed being sown! In such good company, then, Holcus must be good. They are all of the right sort; and the best seeding in the world in this part of the kingdom would culminate in a pasture of the same identical species. The more they are manured the more they flourish, and *Holcus lanatus* survives to the end.

The only other species, the awned and creeping Holcus, frequents our shady ditches, but adds little to the value of our pastures.

Of the several species of Catstail common to Britain, one only is often met with in our meadows; viz., the Meadow Catstail or Timothy, *Phleum pratense*, and this is found in almost every moist meadow in our two counties. This grass is cultivated much in the United States, whence, just exactly one hundred years ago, Timothy Hanson brought over the first consignment of American seed to this country, an experiment which has been often since repeated with much success, as the seed from the New World could be had in any quantity, and came to hand neatly dressed. But it was hardly fair on this account to give the name of "Timothy" to a grass which was long in the land before Timothy Hanson was born; for we find it mentioned by the old writers. Meadow Catstail, or Timothy, is in the south-west an abundant cropper. Sowerby describes the spike as from two to four inches long. I gathered in France many years ago two gigantic spikes nearly six inches long; and Mr. Francis Brent, whose beautiful collection of British grasses is perhaps unique in the Western Counties, tells me he once gathered in England a spike of *Phleum pratense* much longer than my Gaulic specimens. When in dry situations this grass assumes a sort of bulbous root in lieu of its normal fibrous one, it becomes dwarfed in stature.

The Common Bent, *Agrostis vulgaris*, towards the close of summer furnishes much sweet herbage, and makes a striking feature of our pastures with its purplish, plumy, panicle of spreading hair-like branches, marvellously forked and subdivided. The Bents are a very capricious and mutable family, the individual members of which vary according to certain conditions of soil and climate.

The Marsh Bent Grass, *Agrostis alba*, is a very fertile and nutritious plant, and occasionally grows elsewhere besides marshy fields, as I have lately seen its white and brittle roots in a raspberry plot which was mulched with seaweed last autumn. This, added to the wet summer, made the soil very damp; *Agrostis alba* came forth in abundance, and the incessant rains preventing the hoe, gave it time to root in land where it was not noticed before. The roots of this Bent, like those of the Common Couch, are very tenacious of life. The rustics call it White Squitch, and they might be pardoned for imposing a more ugly name, yet its culture withal is highly recommended.

The Creeping Bent, *Agrostis stolonifera*, in a weeping summer becomes a luxuriant grass in Devon and Cornwall, and no mean adjunct to our pasturage.

Agrostis cornucopia was once imported from America, at the enormous price of £68 for a bushel of seeds; but it utterly failed to do here.

I have never met with a single spike of that most excellent English meadow grass—the Meadow Foxtail, *Alopecurus pratensis*,—in Devon or Cornwall. In the heart of England it is often the main crop—the chief meadow grass—especially in the rich pampered lands lying around our great towns and cities. An eminent naturalist suggests that this may have been a grass "originally introduced to our pastures, and not indigenous to all soils as are Holcus and Lolium," or that in some places it may have been limed out.

Of the Clovers, we may mention the Sweet Purple, *Trifolium pratense*, which is the Marl Grass of old renown "so noisome to witches," and is still the standard of our pastures bearing the horse-shoe-leaf; the White Dutch, *Trifolium repens*, which yields a truly delightful herbage for sheep or bullock; and the little yellow Trefoils, *Filiforme* and *procumbens*, all of which enter largely into our pastures. Clovers do best on calcareous soils, and a strew of lime will often bring up dormant seed "scattered by the wild winds ages ago."

This is especially true of *T. repens*; nevertheless in Devon and Cornwall, which are not on calcareous bottoms, and without the aid of lime, this white clover thrives well and naturally, particularly in rich dry loams, and in pastures trodden much and eaten bare. We have no better pasturage, and no surer index to grateful land.

But there appear to be epochs in the existence of pastures when certain plants have their day and pass off; and *T. repens* often abounds in the youth of pastures, from two to four years after the seeding out.

If we notice a few of the grassy weeds which follow our pasture lands, *Achillea millefolium* should perhaps come first. It is at once one of our most common and one of our most valuable plants in sheep pastures. It has a singular drought-resisting property, and abounds in the richest meadows of Devon and Cornwall. A very conspicuous plant near the gateways and along the paths of all our grass-fields is *Plantago major. Plantago lanceolata*, Ribwort Plantain or Rib Grass, is also plentiful with us, though rarely here, I believe, cultivated with clover as a field crop for sheep, as the custom was in Yorkshire and elsewhere.

Passing over many well-known denizens of our pasture lands, we will notice the cheerful little Centaury, and simple Eyebright, which is the Euphrasy of *Paradise Lost.* Two other plants are far from common; namely, *Verbena officinalis*, which has found a place in Roman story and in the apothecary's shop, and that capricious little flower, Ladies' Tresses, *Neottia spiralis*, whose unexpected presence in certain pastures, and equally sudden disappearance, have never been explained. That sweet straggler, the Almond-scented Convolvulus, or Hedgebells, *Convolvulus arvensis*, is often found gadding over our thinner grass lands, where also we are sometimes greeted by the pale blue petals of *Linum tenuifolium*, side by side with the glowing lips of sturdy Rest Harrow, *Ononis arvensis.*

One word for our artificial pastures. It is the custom, with little variation, through all our parishes for the farmer, when seeding out, to sow Red Clover mixed with Eaver. Now the cultivated Red Clover is common to every country in Europe; but what is Eaver? Search the dictionaries of science, and you will hardly find it. But then we know that the Welsh farmers call the Darnel weeds, or wild Rye grasses, Hever, and the French call the same Ivraie; and our West Country Eaver is no other than the dressed seeds of *Lolium perenne*, the Ray or Rye Grass which first came out of county Norfolk.

Neither Burnet, *Poterium sanguisorba*, so dear to the flocks of the South Downs; Saintfoin, *Hedysarum onobrychis*, the Holy Hay of France, which so adorns the Cotswold Hills; nor Lucerne, *Medicago sativa*, have been much cultivated in the south-west, where Italian Rye has long been a favourite, and Succory, *Cichorium intybus*, though unknown as a field-crop, sometimes decks the margins of our grass-fields with its very lovely sky-blue rays. Of late years an artificial clover named Alsike, of North European origin, I believe, has become very popular with our farmers.

Besides the grasses already mentioned, there are a few outsiders, not much good, perhaps, but some of which skirt our fair meadows nevertheless. Bold stragglers are they, which manage to climb over the sheepfold, however often they may be cut off, and utterly cast out. Foremost among these is the Common Couch, *Triticum repens.* Another showy outcast ranking between the Oat and the Holcus, namely, the Tall Oat Grass, *Avena elatior* of Linnæus, was once thought more highly of, and was even cultivated; but its reputation faded away before the anathema of Sir H. Davy. There are also several hungry grasses of the Brome family, and the huge hassocks of the Turfy Hair Grasses, *Aira cæspitosa*, sometimes intrude into our moist meadows. It is one of our harshest grasses, of no known good, yet inviolably armed.

Of all the genera of British grasses Panick is the most rare; and the rarest of all, the *Panicum dactylon*, is peculiar to the shore-line of Mount's Bay. Of all the spots in Britain's isle, the sandy strip between Penzance and Marazion is its chosen habitat, and here it was discovered by a Mr. Newton in the time of our great naturalist, John Ray.

CHEMICAL ACTION.

SYLLABUS OF LECTURE BY MR. A. J. RIDER, F.C.S.

(Read November 6th, 1879.)

MATTER. Influence of force. Physical and chemical changes. Indestructibility of matter. The forces which affect matter contrasted; their correlation. Chemical changes; conditions under which produced; phenomena attending them. Typical modes of action. Nascent state. Conclusion.

THE DRUIDICAL MYTH.

ABSTRACT OF LECTURE BY MR. R. N. WORTH, F.G.S.

(Read November 13th, 1879.)

The lecturer's conclusions were: "That the popular idea of the Druids is wholly founded in error; that neither Cæsar nor Pliny wrote from personal knowledge concerning them; that the professedly historical accounts are contradictory; that the mental and social condition of the races among whom the Druids are said to have lived renders it impossible that the high intellectual status assigned to the Druids could be true; that we have only the most incidental reference to their existence in this country, and absolutely none as to their connection with this locality; that neither survival of superstitions and customs nor archæology afford the smallest evidence concerning them; that, in short, the popular Druid is merely a myth, created for the most part by the baseless fancies of modern writers, having no higher foundation in reality than the medicine-man of America, or the sorcerer of the African continent, and named not from the oak or any association therewith, but from presumed magical powers."

THE "ŒDIPUS COLONEUS" OF SOPHOCLES.

ABSTRACT OF PAPER BY SIR GEORGE YOUNG, BART.

(Read November 20th, 1879.)

The great literature of ancient Greece had two distinct births or outbursts—the Ionian and the Athenian. Of the second, or Attic literature, the drama is the earliest development; and the glory of its invention belonged to Athens alone. The golden age of Athenian tragedy was short: it was measured by the single life of Sophocles. The *Œdipus Coloneus*, his last known work, represents Greek tragedy at its culminating-point; if not the *Hamlet* it is the *Tempest*, of the Athenian Shakspere. In reading Greek plays it is necessary to make allowance for the conditions under which they were produced and acted. We must not judge them by the rules of the Comédie Française, or of the Elizabethan drama. The motions of action are few and simple; the action itself somewhat languishing, to our notions; the characters are heroic in dimension, and massive in colouring; the diction is stately, and even severe. But for passions of the simpler and more energetic sort, for pathetic interest naturally evolved from the story, for consistency and plasticity of character, for poetic charm of language, and for all-pervading good taste, fix your expectations as high as you will, you will not be disappointed in Sophocles.

The plot of the play is best left for the poet to unfold. It depends very largely for its interest upon the peculiar observances connected with the position of a supplicant or refugee in ancient Greek society, and upon the importance attached to the due performance of funeral rites. The religion of the play is Paganism; that is, the worship of the personified forces and features of nature, but deeply crossed by the principles of a pure philosophic morality, retribution for sin, responsibility for wilful, as distinguished from unwitting transgression, and the subordination of the lower to the higher laws of conduct in cases of conflicting duty.

In trying to give an idea of the beauties of the play one is obliged to have recourse to a poetical translation. Unfortunately, there is no accepted English version of Sophocles. The faults of the published translations are chiefly due to the deficiencies of their authors as writers of English verse. They have all been professors of Greek. It is therefore possible, with their help, for a very inferior scholar to arrive at a more readable rendering, without departing further than they do, or even so far, from the meaning of the original. (This has been attempted in the specimens given in the lecture.)

The great secret of success in translation, as in all other art, literary or other, is to take pains. Poetical translation has fallen, as an art, into unmerited contempt, because translators are careless. It is, however, one of the most legitimate and pleasure-giving of arts, not merely to practise, which is pretty generally allowed, but also to enjoy, as practised by others. The crown of poetical translators in English literature, so long worn by Pope, is now transferred to Shelley. Those who despise the *Iliad*, or the *Hymn to Mercury*, must be content to have their judgment as critics questioned. Those who speak evil of the art in which two such poets have laboured to excel, may fairly be challenged to defend their strictures with modesty.

The requisites of a good verse translation are, first of all, good verse; secondly, good scholarship; thirdly, good taste; the last, including a great many requirements. The first is most often neglected at the present day; the second was very deficient in the translations of the last century. The verse must be English in form; it is safest to follow accredited models from the English poets. In drama, for the dialogue, nothing but the dramatic verse of the great Elizabethans and their successors appears admissible. When the original rises to be poetical, in the higher sense, the translator must rise with it; but he must write good verse always. A translation which is good in point of scholarship must give the meaning and force of each sentence, and even of each word; but must not for that purpose transgress the laws of the English language, or of good taste. When it becomes necessary to sacrifice something, the grammar, that is, the form of construction of the sentence, should go; not the force of the separate words, not even their order, if that order be at all significant. In point of meaning, the translator had better add no ornament of his own, not even by way of compensation for the loss of beauties in the original which have unavoidably disappeared in the process of translation. But he may, nay must, endeavour to supply the place of the march and music of the sound of his author's verse by making his own verses sound as well as possible in English ears, with the help of all that he can master, in the way of measure and music, of what has been taught him by the English poets. On the other hand, he need not vex himself overmuch by the unlikeness of the forms of modern poetry to those of ancient poetry, now irrecoverably lost. The genius of true poetry is independent of dialect, and passes through all ages of time.

PLINY'S LETTERS.

SYLLABUS OF PAPER BY MR. J. D. LEWIS, M.A.

(Read November 27th, 1879.)

Pliny the younger; his life and era; importance of his letters; correspondence with Trajan; corruption of the Roman world; statements of Juvenal, Martial, &c.; cultivated society in the empire; slavery; the amphitheatre; Pliny and Christianity; the religious belief of his contemporaries.

THE PHŒNICIANS AND THEIR NEIGHBOURS.

SYLLABUS OF PAPER BY REV. J. M. HODGE, M.A.

(Read December 4th, 1879.)

Geography, Ethnology, Polity, History, and Mythology. On a Hebrew element in the Phœnician voyages and settlements. The Phœnicians, Dorians, and Hyperboreans. On the state of civilisation and religion in the West, especially Britain; and on the inference of Phœnician trade and colonisation.

THE CORNISH LANGUAGE.

BY THE REV. W. S. LACH-SZYRMA, M.A.

(Read December 11th, 1879.)

THIS subject is of some interest and importance.

1. Because language, especially the Aryan family of languages, is a consistent whole, and the problems of philology and ethnology have to be solved only by a comprehensive view of the whole subject, and not merely of its parts. Their not realizing this was the error of the etymologists of the last century, who looked to the three learned languages—Latin, Greek, and Hebrew—as alone deserving scientific study. The discovery of Sanscrit has changed all that. To it, rather than to Latin or Greek, and most certainly rather than to the Semitic Hebrew, we look for solution of linguistic questions; but every language, even such as our ancestors regarded as barbarous, assumes an importance, at least as a mesh in the linguistic net. The loss of one mesh mars a net, so the loss of one language makes the solution of a question obscure and uncertain. The loss of Cornish may be the loss of a link in a great chain. Some of the most barbarous and despised of European tongues are of the greatest importance. None exceed in interest the Basque or the Magyar, islands of Turanian in the midst of the ocean of Aryan speech.

Of the Aryan tongues few are more interesting than the Manx and the Icelandic, and even the Frisian dialects and the vulgarisms of many an English county become of scientific interest. The last dead of the Aryan tongues—*i.e.* last dead after the Old Prussian—becomes therefore of great importance, more especially to some of us, whose ancestors a few centuries ago may have greeted the English traveller who asked them the way, with the Cornu-British sentence, *Me a navidraa cowza Sawzneck* = "I have not learned to talk in Saxon."

I ask you, then, to give me a little patience while

(1) I define what the Cornish language really was;

(2) What literary remains exist of it;
(3) How it decayed, and when it died out;
(4) What relics of it still exist in common speech in the county.

The first thing that strikes one about the Cornish is, that it was a caseless or almost caseless language. On this there has been some dispute. Norris and Lhuyd assert that ancient Cornish had a genitive, but the absence of it in ancient MSS. has raised doubts on this point. This Cornish genitive was said to be formed by changing (α) *a* into *e*; *e.g. Marh*, a horse; *Rên Verh*, a horse's mane; or (β) *e* into *y* or *ey*; *e.g. Merh*, a daughter, *An Vyrh*, of a daughter.

Some however are inclined to view Cornish, like the other Cymric languages, as caseless, and that this Cornish genitive (though formed on a system similar to the Irish) was a mere later corruption. Otherwise the cases were formed as in English, and in most of the modern languages of Western Europe, by prepositions:

1. Genitive by *a*; *e.g. Arluth a ras*, Lord of grace.
2. Dative by *the* or *thee*; *e.g. the dre*, to town.
3. Ablative by *a*; *e.g. a vaghty*, from a virgin.
4. Vocative by *a*; *e.g. a vap.*

The similarity of genitive and ablative reminds one of Greek. It is a curious point that in most Aryan languages the dative and ablative plural should be similar. Carew mentions the general similiarity of Cornish and Greek.

The articles were:

α. *An*, the definite article.
β. *Un*, the indefinite article.

This produces a quaint effect to English ears, for *an* implies *the.* Thus Street-an-Nowen (the village near where I live, a part of Newlyn) means "The new road;" *i.e.* Street = road; An = the; Nowen = new.

Pedn an las. *Pedn* = headland; Latin, *caput.*
An = the.
Las = green, ellis, &c.

The article often *follows* the noun, which gives a curious effect, and presents a difficulty to some Cornish folk, acquainted only with a part of the glossary of their language, in understanding the meaning of names; thus:

Chy an dour. *Chy* = house; Latin, *tectum*; Irish, *tigh*.
An = the.
Dour = water; Greek, ὑδὼρ.

"The house by the water."

The plural of nouns was formed in Welsh and Armoric in many ways.

α. *Ow* = Welsh, *au*; Breton, *ou*.

β. *ion*, the characteristic Celtic plural; Welsh, *ion*; Breton, *ien*. Query. May not the Germanic plural *n* (in our English "children") come from the same source? In the Latin and Slavonic plurals we do not find *n* much used in the nom. plural.

γ. *y*. This is found in Welsh and Armoric. In the Romanic and Slavonic we find it also. It is almost universal in the older Aryan languages.

δ. In some words the plural was the stem. This sounds strange to western ears, but it is common in Slavonic languages, the genitive plural often containing the root. The custom is not unnatural. Do we not in many cases want the plural more than the singular?

e.g. *gueyth*, trees; *guethen*, a tree; English, withy.
deyl, leaves; *delen*, a leaf.

η. In many instances the plural was formed as in English and French, by adding *s* or *es*, and sometimes *eth*.

θ. A change in the body of the word. We have instances of this in English; *e.g.* *feet* for *foot*.

ι. *n* merely, not *ion*. This is still used in Cornish, *housen* for houses.

There was a kind of dual number in Cornish, but not a true dual, as in Greek or Hebrew; *i.e.* formed by a peculiar termination. It was merely a prefix, *dy* or *dew*, added to the word, and absorbed into it. It was thus a sort of agglutinative dual, as in Turanian languages; *e.g.* *Duscoth* = the two shoulders. *Deuglyn* = the two knees.

The adjective usually follows the noun, as in so many Continental languages at present; *e.g.* *Mor ruyth* = the "Red Sea." We have still an instance in Trewidden = "Place white." *Carndhu* = the "black carn," or "carn black" literally.

The numerals are at present the most interesting part of the language, as the part of which the tradition is most lively, with the exception of the names of places and persons. It is curious that people should have continued to count in Cornish after they used English for other purposes, and that the memory of the numerals up to twenty should have survived to the present day among a few old folk. The reason, however, is not difficult to find. People count in their mother tongue even when they use some other for general purposes. There is a Yorkshire system of sheepscoring which may be a relic of the extinct Cumbrian language. At any rate, it seems the Cornish folk used the Celtic numerals for counting pilchards, &c., up to a score, after they had forgotten the language itself. Living Newlyn tradition gives the numerals thus:

1	On
2	Deu
3	Try
4	Paji (Padzher, Roberts)
5	Pemp
6	Wheith
7	Eith
8	Seth
9	Nau
10	Deig
11	Unjack
12	Dorthack
13	Torthack
14	Peswarthack
15	Pempthack
16	Whethack
17	Eithack
18	Leithack
19	Naunjack
20	Igaus

The Cornish personal pronouns, though free from the cases which puzzle and trouble our juveniles in Greek and Latin grammars, present another difficulty of a more formidable character in their fourfold forms. Each pronoun may be represented in four ways. Of these pronouns nothing remains in living tradition, unless it be *Deu gena why*, which I have heard is still used as a sort of saying in some place. The meaning of this is *Adieu*. *Deu* = God, the Latin *Deus;* French, *Dieu*. *Gena* = with. *Why* = you; *i.e.* the pronoun in form I. or II.

	I.	II.	III.	IV.	Poses.
I =	My, me	Vy	'm	'f 'm	Ou
Thou =	Ty	Sy, gy	'd th	's	the
He =	Ef	Ef e	'n	'o	y
She =	Hy	Hy, y	's	y	y
We =	Ny	Ny	'n	'n	agan
You =	Why	Why	s	ugh	agas
They =	y	y	's	e	aga

I. Personal pronoun in simple use.
II. Personal pronoun in regimen; *e.g.* Fr. *moi* and *toi*.
III. Personal pronoun after particle ending with vowel.
IV. Personal pronoun after a preposition.

The idea of rendering the personal pronoun by a single letter is not to my mind unphilosophical. The Cornish showed sense in using it thus.

The Cornish verb was like the Armoric in many points. It could be conjugated in three modes—(1) The inflected conjugation; (2) The impersonal conjugation, the third person being only used, and the true person marked by pronouns; (3) The auxiliary verb used.

There were five tenses in Cornish—I. The present or future (both confused together. N.B.—The Welsh future is used also as the present.) II. Imperfect or secondary present (optative). III. The preterite. IV. The pluperfect (secondary perfect of Zeuss, used as conditional in Cornish. V. Subjunctive present or future. Infinitive sometimes is a mere root.

I. Caraf = Ceryn.
Ceryth = Carough.
Car = Carons.

Like most Aryan languages, the Cornish had two roots for the verb "to be."

a. *As*, the Sanscrit *asmi*; Latin, *sum*; Slav., *jestem*; Eng., *as*.
β. *Be*, Sans.; Latin, *fin*; Slav., *bye*; Eng., *be*, *was*.

It is curious that the arrangement of these two roots is very like what it is in Slavonic.

e.g. *As* is the root used for the present tense.

Let us compare Cornish:

Of = I am. (Query. *Om* by Celtic mutation *of*.)
Os = thou art.
Yn = he is.
On = you are.
Ough = you are.
Yns = they are; Slav., *sa*; Latin, *sunt*.

The verb "*to have*" was expressed as in some Cymric languages by *cafus* = "to take," or else by the same form as we see in French in *C'est à moi*; *e.g. Est pro habeo.* We still see this aversion to the use of *have* among the Cornish people in the occasional use of "It belongs to me" for "I have." There is another instance of the retention of Cornish syntax in an Anglicized form of the expression, "Put him to a place." This, in Old Cornish, was "gora." "To put" is still used for "to lead." Probably the difficulty of finding the way in the country caused this expression.

As to the irregular verbs, Mr. Norris worked out a long list of them, which students may consider at leisure.

Of the indeclinable parts of speech I shall confine myself to a few remarks.

(1) The one is the adverb *bras* = very, still used in *brave*, or *bravish*.

(2) The conjugation *hag* seems to linger in *pedn-ha-meam*, the game of heads and tails. This *ha* or *hag* is from the same origin.

(3) The interjection *Avec* for Rafana Ra Maria, *m* becoming *v* by mutation. It originally was a mediæval oath—"By Mary."

The question will naturally arise, "How can you venture to give such details of the minute grammatical inflexions of an extinct barbarous tongue, utterly despised while it lived, and which died from the sheer contempt with which it was treated?" Had there been no literature in Cornish this would have been impossible; but as a matter of fact a small literature does exist, not quite devoid, to my mind, of intrinsic merit, though peculiar in character.

The Cornish literature with which we are familiar is for the most part (*i.e.* three-quarters at least of it) composed of that which is at present the most despised form of literature in the county; *i.e.* dramatic poetry.

The ancient dramas were—

A. The Scriptural Dramas: 1. "The Origo Mundi." 2. "The Passion" (seemingly the most popular). 3. "The Resurrection." 4. "Death of Pilate." 5. "Ascension."

B. The "Berinans Meriasek," the last discovered Cornish drama, relates to a local subject; *i.e.* to the legend of St. Meriasek and Constantine, and the last struggle between Christianity and heathenism. The only MS. extant was discovered in 1869 among the Hengwrt MSS. in Wales, and has been published by Mr. W. Stokes.

C. "The Creaçon of Jordan," the last drama of Old Cornish, adapted from the mediæval dramas, but with an evident post-Reformation tone, written by Jordan in 1611; *i.e.* under James I.

In addition to these we have—

1. "Mount Calvary," the national epic.
2. A Cornish Latin vocabulary, apparently to teach Cornish boys Latin, possibly the oldest remains in the language.
3. A Song.
4. The story of John of St. Levan, given by Pryce.

In addition there are a collection of proverbs and motives in what is called "Pryce's Grammar."

Such are the remains of the literature of the language already printed; but there are some pieces in MS. which, if the "Cornish MS. Society" should become a fact, may be yet published. The largest of these is a journey of the Duchess of Cornwall in Cornish. You may, however, well imagine that from these literary remains something may be gathered as to the general character of the language. The drama of the "Berinans Meriasek" is larger than most of Shakspere's plays; I should say as long as both parts of "King Henry IV." The scriptural dramas nearly fill, with their translation, two good-sized volumes in Mr. Norris's edition. "The Creaçon of Jordan" fills a thin volume in Mr. Stokes's edition with its translation, and is a drama of fair length.

In spite, however, of this quantity of matter there are numbers of words doubtless which have been lost. The Rev. B. Williams's splendid *Lexicon Cornu-Britannicum*, a triumph of industry and learning, was unfortunately published too early; *i.e.* before the discovery of the "Berinans Meriasek." It is not complete either in not admitting the words which have lingered or become imbedded in the Cornish dialect. It is, in fact, merely a dictionary of literary Cornish as it was known ten years ago, but not of the whole remains of the language. A new edition or a supplement is greatly needed; for the scriptural dramas and the epic of "Mount Calvary," with such relics as Pryce and Lhuyd published, are by no means the whole of the *débris* of the dead language which are available to the enquirer. A supplement is needed to represent the words of the "Berinans Meriasek" and the examination of the Celtic remains in the living Cornish dialect, or the traditions of them remembered by the old people. As to the grammar, however, I think Mr. Norris and Zeuss had sufficient data on which to build their schemes.

JUDGES AND ADVOCATES.

BY MR. HAMILTON WHITEFORD.

(Read December 18th, 1879.)

ROMAN DEVON.

BY MR. J. BROOKING ROWE, F.S.A., F.L.S.

(Read January 15th, 1880.)

AFTER referring to the importance of the subject, the lecturer proceeded: "So long ago as 1780 Richard Gough, the antiquary, said that "the Roman topography of Britain was a field of enquiry still open to diligent investigators, who have opportunities to make observations on the spot, and examine the innumerable camps and roads concealed in many parts of the island, from which, if traced with attention before time and civilization have completed their destruction, an almost new Notitia might be deduced."* Although the advice of the good old antiquary has been taken by some, and the ancient topography of some counties (Somerset, for instance) well worked out, but little has been done so far with regard to our own county. The late Mr. Henry Woollcombe examined and planned a large number of the hill-forts and so-called castles. Many have been described and illustrated by Mr. Hutchinson, of Sidmouth. There are scattered references to others in the *Archæologia*, the *Transactions of the Devonshire Association*, the *Archæological Journal*, and elsewhere; and the county historians have referred after their manner to the traces of Roman occupation. But the work requires to be done systematically—the scattered notices collected, and roads and forts carefully mapped. I commend this interesting labour to any one with sufficient time to devote to it. If the progress of civilization and the ravages of time needed to be combated a century ago, how much must have been lost since then? Indeed, many of the forts, &c., marked on the map behind me, are no longer to be found; the plough has gone over them, and the tale which they might have told us lost for ever. My intention this evening is merely to draw attention to the subject, to lay before you some unconnected notes, to inform you of some recent speculations as to the topography of Roman Devon, and to leave the matter with you for discussion."

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* "Eng. Top.," p. 17.

The lecturer then recalled the main facts connected with the Roman Conquest of Britain, and said that although in its broad outlines the history was known to every schoolboy, the details had yet to be worked out much in the same way as Dr. Freeman had worked out and dealt with the later conquest by William of Normandy. The investigations of Guest, Beale Poste, Clifford, and others, were mentioned. He then proceeded: "It has generally been supposed that from the departure of Julius Cæsar after his second campaign B.C. 54 until the coming of Claudius A.D. 43, although a nominal allegiance was submitted to, that there was no attempt on the part of Rome to exercise any right of sovereignty, and that no armies visited the shores of Britain. Evidence of this seems to be afforded by the discovery from time to time of coins bearing the names of British princes, knowledge of whom is derivable from this source only. But independently of the preparations made by Augustus about twenty years after Cæsar's second invasion, there appears to be some ground for believing that an actual descent was made by Augustus before. It is clear that during the period to which I have referred there was communication to a considerable extent between Britain and the rest of the Roman world, more especially, as might be supposed, with the Imperial city; but it was believed that this was all. In a very ingenious and learned paper contributed to the *Archæologia* by the late William Henry Black, a short time before his death, evidence is adduced which throws a doubt on this supposed freedom from invasion. His proofs are drawn from various passages in the Latin poets; but his main argument is derived from the commentary of Maurus Servius Honoratus on Virgil, written in the fourth century. The passage commented on is from the third book of the *Georgics:*

"'I shall be the first to do what none other Mantuan hath ever yet done. I shall carry the Muses into my own country, if I live long enough to return from the classic regions of Greece. I'll build a temple on the banks of the Mincio. There I'll found ceremonies, and games, and sacrifices, and shows in honour of Augustus; and there I shall have captive Britons to carry embroidered scenery, in which his triumphs shall be represented.'

"Or as the latter part is rendered by Dryden:

> "'I to the temple will conduct the crew,
> The sacrifice and sacrificers view;
> From dance return attended with my train,
> Where the proud theatres disclose the scene,
> Which interwoven Britons seem to raise,
> And show the triumph which their shame displays.

"The note upon this passage by Servius is as follows:

"'This he hath said according to history. For Augustus after he conquered Britain gave to theatral duties very many of the captives whom he had brought. He gave also Aulæa, that is Velamina, in which he had depicted his victories, and how the Britons given by him should carry the same vela, which in fact they had been accustomed to carry.'

"And again later on, he speaks of the triumph of the Britons, still referring to Augustus.

"These and other similar passages collected by Mr. Black certainly seem to point to an actual hostile descent by Augustus, but of its nature and extent we have no knowledge; and of course it cannot be connected with our own immediate locality in any way."

The wars of Claudius and Vespasian were then spoken of, and an attempt to ascertain to what extent the west country was affected by them. Of the latter the lecturer said: "It is most evident Cæsar did nothing, that the conquests of Aulus Plautius and Claudius resulted after all in the subjection only of what Mr. Poste calls the Central States, namely, the central parts of the late dominions of Cunobeline, and I have referred to them to show that Devonshire was so far untouched. The wars of Vespasian were waged, there is good reason to believe, against only the Belgæ and Dumnonii. Tacitus does not give much information as to the places in which the battles of Vespasian were fought, but refers merely to their importance, and shows that they were the steps to the future advancement of the general. Then Tacitus speaks of the nearest parts of Britain being reduced into the form of a province, showing that the conquest of the Belgæ and Dumnonii was subsequent to the victories of Plautus and Claudius. 'The countries of the Belgæ and Dumnonii seem peculiarly calculated to have given the historian the idea of the *proxima pars* Britanniæ, as Cæsar speaks of the southern coast from Foreland to Land's End as being the part of Britain nearest to Gaul.'*

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* Beale Poste, "Brit. Researches," p. 328.

"The war appears to have commenced in the spring of the year 45. The army which Vespasian had was his own legion, the second, which he commanded, and which he brought from Germany. This with auxiliaries made up a force of 13,000 men. From the Imperatorship of Claudius it would seem that the war lasted through 45 and 46. Vespasian is said to have fought thirty-two times with the enemy. Deducting from these the five engagements which took place during the first two years of the war with Aulus Plautius and Claudius, there are twenty-seven battles, but of these there appear to be only six recorded. In 47 it would seem that there was a revolt; for Dion Cassius tells us that Vespasian was nearly cut off in that year. He is described as having been taken by surprise and hemmed in and beleaguered by the Britons, and enclosed with entrenched works, and was only rescued with difficulty by a force sent opportunely to his aid. It is obvious that the resistance encountered by Vespasian on the part of the Belgæ and Dumnonii was of the most obstinate kind. The contest must have been full of incidents, but unfortunately the loss of historical records scarcely more than permits us to satisfy ourselves that such a contest was carried on. I believe that in the camps and fortified hills remaining, there is ample evidence of a severe struggle for supremacy.

"That the battles of Vespasian were won in the territories of the Belgæ and Dumnonii is, independently of what I have said, supported by tradition. No reliance can be placed on the various statements contained in the writings of the old chroniclers; but there must have been some grounds for the common belief that Vespasian won his victories over the inhabitants of the west country. Of course credence has been given, even by modern authors, to these accounts, and one writer about thirty years ago gives us such circumstantial accounts as the following:

'The rebellion in which the Dumnonii were principally concerned was during the reign of Claudius, A.D. 49, when the Britons, burdened with taxes, and harassed by the pride and insolence of the Roman soldiers, revolted, and their king, Arviragus, refused to pay the accustomed tribute to the Emperor. Claudius lost no time in sending his general, Vespasian, with reinforcements to the legions. Vespasian soon appeared with a powerful fleet off the coast of Kent, and attempted to land at Rutupæ; but the Britons being on the alert prevented him. Unsuccessful at this point, he sailed along the southern shores, and shortly reached Totonesium Littus, now Torbay, where he disembarked his troops without opposition, as the Britons, not expecting him in that quarter, were unprepared for resistance. Having effected his landing without loss, he marched with all haste to Caer Penhulgoite, the capital of Dumnonii, in expectation of surprising it before the news of his arrival could reach. In this he was mistaken ; for whether the citizens were apprised of his arrival or not, they were prepared for a vigorous resistance. The Britons not paying the least attention to his summons to surrender, he closely invested it, supposing in a few days he should compel them to open their gates. In the meantime the inhabitants, who were resolved to hold out to the last extremity, contrived to send intelligence to Arviragus of the landing of the Romans and the blockade of their town. Arviragus immediately marched to their relief; and Vespasian, who was informed of his approach, prepared to give him battle. After a long and bloody engagement, the victory remaining doubtful, a truce was agreed on between the two generals, and by the mediation of Genwissa, the queen of Arviragus, who was daughter to Claudius, a permanent peace was established after the siege had continued eight days.'

"For the whole of this circumstantial statement there is not the slightest historical evidence. But still there is a line of truth running through it, and the traditions thus preserved support the argument that the Dumnonii were not conquered as the other tribes were, but that the Romans, from the nature of the country and the valour of the inhabitants, were compelled to conclude a peace on terms which the other tribes were unable to obtain.

"The ultimate results of this war are thus summed up by Beale Poste: 'The Belgæ were made part of the province of Britannia Prima, and subdivided into two subordinate native governments; *i.e.* the Belgæ and Durotriges, which division we find in *Ptolemy*, and which we may connect with this period. The Dumnonii appear to have been better treated, as they retained their nationality under their native princes. Thus we find they were called the Gens Dumnona a century after. They enjoyed their territory unmolested by the Romans as far as we know, and there is no record in ancient authors that there was ever a Roman garrison among them; the only apparent instance to the contrary the Legio Secunda Augusta noted in *Ptolemy* as stationed at Isca Dumnonum;' but this is not the case, as we shall see, if Exeter is not Isca Silurum, and is therefore another proof of what I am saying. (p. 332.) 'The defence of the coast, too, was evidently left to the owners; for not a single cohort, we learn from the *Notitia*, was stationed in territories of the Dumnonii.' (p. 24.) Whether the people were more submissive, which is not likely; whether they considered they had more to gain by living in peace with the invaders; or whether, on the other hand, the Romans thought, from the nature of the country inhabited by the Dumonnii, their entire subjection was, if not impossible, a work of such magnitude that they shrunk from the attempt; certain it is that the country now represented by the counties of Devon and Cornwall, with the immediate surroundings on the land sides, was treated in a very exceptional way, and the lawful inhabitants allowed to manage their own affairs as they pleased. It is also evident, I think, that the relations were of a friendly nature; for after the outbreak in 47, in which the Dumnonii might or might not have been mixed up, we do not find that they gave any trouble, but seem to have been satisfied with the comparative independence they were permitted to enjoy, and everything seems to prove that the relation between the Roman and the antient inhabitants was long and peaceful.

"The independence of the Dumnonii is further shown by an inscription referred to Mr. C. Roach Smith. It would appear that during the building of the great wall, not only was every soldier compelled to lay aside his sword and armour, and become mason or carpenter, or perhaps both by turns, but that the British States were taxed for the cost, at all events in part, of this work. It does not, I think, follow that the inscription referred to proves this. It seems to me that the States mentioned, and there are only four—"CIVITAS DVMNON" being the second—had done something in connection with the building of the wall deserving of special commemoration. Had there been a general taxation it would not have been considered worthy of this honour, and the four States mentioned would not have been the only ones to have been thus handed down to posterity. It may rather be concluded that the assistance given, whatever its nature might have been, was of a voluntary and unexpected nature, and thus thought worthy of honour."

The lecturer then detailed the theories of Mr. Gordon Hills, contained in his paper on "The Measurements of Ptolemy and of the Antonine Itinerary, applied to the Eastern Counties of England,"*

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* "Journal British Archæological Institute," vol. xxxiv. p. 271.

and also the opinions of Horsley as to the difficulties encountered in regarding Exeter as Isca Dumnoniorum, which would be overcome if the ideas of the later antiquary could be adopted. "Dorchester would then be Isca, where the amphitheatre and numerous evidences of Roman occupation attest its importance. Those who support the claims of Exeter have to conquer an initial difficulty, a locality there for the accommodation of the Second Legion, and this is to some extent got over in the case of Dorchester. But this supposition places Isca in the country of the Durotriges. This British State is simply mentioned by Ptolemy, and placed by him next to the Dumnonii westward, with their capital Dunium; and it has been considered that the tribe was a branch of the Belgæ, and to have inhabited the present Dorsetshire. But, as Mr. Beale Poste says,* if this position be correct, it is evident that Dunium cannot be Moridunum as frequently supposed—'a place, according to Antoninus, near Exeter, but must rather have been inserted by mistake for the Durnovaria of this last author, the modern Dorchester.' If I may venture a theory it would be that the Durotriges were conquered with the Belgæ, their state handed over to the Dumnonii, the latter resisting any attempt to plant a military station within their own proper borders, and that the antient city of the vanquished tribe became the capital of the newly-arranged districts. Is there not some little corroboration of this in the extraordinary number of hill forts against the borders of the Durotriges, while on the borders opposite the boundaries of the Belgæ they are few? Or does this merely indicate that while in the former district the population of both tribes was greater, in the latter it was sparse, and little protection was needed? or does it indicate, on the other hand, that the relations between the Dumnonii and the Belgæ were of a friendly nature, contrary to the general belief, and that those between the Dumnonii and the Durotriges were the reverse?"

With regard to Exeter, the lecturer did not for one moment doubt its high antiquity, or that it was a place of importance in Roman times. He thought, however, that there were many difficulties to be cleared up before it could be finally decided that it was the Isca of the *Itinerary*. The confusion between Iter XII. and Iter XV., and the suggestions of Horsley and Gale with reference to them, and other difficulties increased by the supposed authority of Richard of Cirencester, now proved to be a forgery, were discussed.

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* "British Researches," p. 91.

Postponing to some other occasion a consideration of the many evidences scattered throughout the county of the influence which the Romans exercised upon the manners, customs, and social life of the people with which they were brought into close relations after the time of Vespasian, the lecturer concluded : "The Roman's principal business in these parts was to obtain metal, and as long as he was able to do this, and take away what he obtained to his ships without interruption, he was satisfied. On the other hand, if the people were not interfered with, if they were allowed to pursue their own way ; and above all, if they were not in perpetual fear of their antient enemy, then kept down by the iron hand of mighty Rome, they were satisfied. The British roads improved by the Roman, the art of mining developed, trade encouraged, and the refinements of Latin civilization gradually introduced, the Dumnonii, unconquered by Rome, regretted the loss of her protection for other reasons than those of the weak and wretched northerners, who suffered themselves to be dragged from the walls their conquerors had built, and which they were not able even to defend. And then slowly but surely came the Englishman. Every inch of ground gained only after resistance the most stubborn, and when at last the victory was won, a cruel use was made of it. It is evident that in almost every case where we have any traces of the struggle that the destruction was of the most determined kind, and frequently by fire. Why was it that the dwellings of the Roman and of the Roman Briton were so ruthlessly destroyed? The villas of the Roman, and of those who dwelt at peace with him, were the abodes of an amount of refinement to which the Englishman was an utter stranger. He was a warrior, and a man constantly on the move. He succeeded in winning battles in the field, and the walled towns then became fortresses against him, and all his energies were therefore devoted to their destruction. Having succeeded, sooner or later, after a hard struggle in obtaining an entrance, the inhabitants were slaughtered, and as far as possible all buildings rased to the ground—lofty structures, towers, temples, and basilicas, all were thrown down, and the portions which could not be absolutely destroyed, such as thick walls of brick and stone, of which we have examples remaining at Richborough and elsewhere, were rendered useless for their original purpose by extensive breaches being made. The warfare lasted for nearly a century and a half. During this time the towns were gradually disappearing. There is not a single Roman-British embattled town wall left in England, although portions are to be found which show their original extent, as at Pevensey. And the conquerors put nothing in the place of what they destroyed with so much determination. I have shown before in a previous paper of what the dwelling of the Saxon consisted—his enclosure surrounded with ditch, embankment, and palisade, with the motte for defence. It was forbidden to erect stone buildings, as they might fall into the hands of the enemy; and when the occasion for this passed away, the tradition continued down to a late period; and I think that in the necessity for obtaining from the king in mediæval times a license to crenelate a dwelling house we have a relic of the antient custom still surviving. And thus the Briton was driven back, and thus at last, although very late, the footing of the Englishman, ruthless and as regardless of the rights of tribes and of peoples in the seventh as in the nineteenth century, was secure, and the weaker lost his home, his country, and his all. And the descendants of the Dumnonii had to succumb with the rest of Britain, and the comparatively few inhabitants within the borders of the antient tribe had eventually to bow to the conqueror. There were no important citadels to destroy, no great cities to sack, no magnificent villas to reduce to ruin, but what there was shared the common fate."

NOTE.—I understand that this lecture gave rise to some newspaper discussion both in Exeter and Dorchester, but I have not seen anything of it, nor has any communication reached me with reference thereto. My friend Mr. J. B. Davidson entered into a correspondence with me upon the subject, the result of which has been the production of an important paper by him on "The Twelfth and Fifteenth Itinera of Antoninus," which he read at a recent meeting of the Archæological Institute, and which will be shortly published in the *Archæological Journal.* Mr. Davidson entirely disagrees with the opinions of Bishop Clifford and Mr. Gordon Hills, and cannot believe that the military road to the south-west of Britain could have ended at such a distant post as Dorchester. The value of anything written by Mr. Davidson is unquestionable; and it is to be hoped that more attention may be paid to the history of Roman Devon, and that further light may be thrown upon these and other difficult matters connected with the subject. Is there no one who will do for Devonshire what Prebendary Scarth is doing so well for Somerset? J. B. R.

SURVEYING BY PHOTOGRAPHY.

ABSTRACT OF LECTURE BY MR. W. G. TWEEDY, B.A.

(Read January 22nd, 1880.)

THE lecturer began by stating that for many years he had believed surveying by photography to be the process of the future, but that until recently the conditions necessary to make the process practical in the field had been lacking. This had been supplied during the past year. By means of the gelatino-bromide process, dry plates were produced that had but one fault—they were almost too sensitive; and he had there for inspection pictures taken in the sixty-fourth of a second, measured time. There were now many makers of such plates, and they could be purchased, ready for use, at a cheap rate.

As long ago as 1862 the lecturer invented a revolving camera, by which a picture in cylindrical projection could be taken on a flat plate of glass, including, if necessary, the whole sweep of the horizon in one continuous view; and in March, 1863, he published a complete description of the invention, signed W. G. T., Plymouth, in the *Photographic News*, and deposited some pictures taken by the instrument in the hands of J. H. Dallmeyer, the eminent optician. Copies of some of these pictures were on the table. In October of the same year Mr. J. R. Johnson took out a patent for a similar invention to that which the lecturer had described more than six months before. Mr. Johnson called his the "pantascopic camera," and it corresponded in every detail with the lecturer's. This was another example of simultaneous invention, but the lecturer claimed the contrivance as his, by virtue of prior publication.

At that time the wet collodion process was the only satisfactory one, and surveyors, even if they appreciated the powers of the "pantascopic camera," would have required the services of a professional photographer and a waggon-load of apparatus, so the matter rested. Last summer the lecturer used some of the new gelatine dry plates in his camera, and found it easy to obtain by their means panoramic pictures containing upwards of 120° of horizontal angle (azimuth), and 30° above and below the horizontal line.

From these views the altitudes and azimuths of all objects in the picture could be measured off by means of two simple scales, one of equal parts, each equal part being 1 degree of the circumference of the circle whose radius was the equivalent focal length of the lens, and the other scale, for altitudes, an ordinary scale of tangents constructed to the same radius.

The system of surveying a given extent of country is as follows: Two stations are chosen at the same level, and the distance between them is measured by the chain. From each station a photograph is taken, including the other station and the objects whose relative positions are to be determined. From the two photographs, the azimuths, or lines of bearing of every object shown in both pictures, can be measured off by the plain scale, and plotted by a protractor from each end of the base. The intersection of the two lines gives the position of the object, and as the length of the base is known, the *distance* of the object is capable of being measured. This distance being known, its actual height in feet or yards can be found by measuring its height above the horizontal line in the picture by the scale of tangents, in conjunction with the known distance. By this means the heights and distances of all objects visible from *both* stations can be ascertained by measurement of the photographs in the quiet of the office, the actual operation in the field occupying only a few minutes.

During the course of the lecture Mr. Tweedy exhibited the apparatus, and explained its action; he also showed many photographs taken with it, which were much admired for the great amount of subject they included, and their admirable rendering of instantaneous effects.

SANITARY SCIENCE IN RURAL DISTRICTS.

BY MR. J. C. INGLIS, C.E.

(Read January 29th, 1880.)

The impetus given several years ago to this branch of science, for so it is now, was due to the recognition of the fact that disease in certain forms produces an indefinite number of disease centres, usually called germs, capable of producing similar diseases in other individuals with whom they come in contact.

Dearly-bought experience has taught communities that the general health, especially during the prevalence of infectious diseases, entirely depends on their exertions in removing conditions favourable to disease; and if we believe antiquaries* who have carefully searched the public records of Stratford-on-Avon, Shakspere's father, poor man, seems to have been sorely persecuted in this respect. In 1552 he was fined for depositing filth in the public street, and again in 1558 for not keeping his gutter clean; proofs that even in those early days as keen a watch was kept over the public health as now.

After the reign of Queen Elizabeth, all this activity seems to have subsided, except when one of those fearful plagues visited this island.

At last, however, in 1831, the awakening given to people and parliament by the great Asiatic cholera commenced the agitation for sanitary reform, which with ups and downs we have inherited. Since then commissions and investigations have been held in every branch of the question. Acts of Parliament have been as freely passed; in truth, too freely, for the laws relating to public health became so complicated and contradictory that a general bill for the consolidation of all previous laws was passed in 1875.

Sanitary Science, to define it, is a statement of cause and effect, so far as is known to be true, for all phenomena relating to the influence of physical surroundings on the vitality of the system. Looked at in this broad light, it is seen to cover a very extended area, bounded on the one side by the smallest acts of the individual, on the other by the most general and wide-spread changes, due to causes far removed from our control and even knowledge.

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* C. F. Gardner, in "Rural Sanitary Science."

To some there may appear an irrelevance in rural districts being specially considered, and as it were brought on a level with the lower districts in towns, to which alone, according to many, sanitary principles can be applied. On reflection, however, the mere fact of a house being in the country is anything but a guarantee of its healthy condition, and were it not for the exceptionally healthy surroundings country people are exposed to, during the greater portion of the day, many would give way, and not a few do, to the damp, noxious sewage emanations they are exposed to during the night.

Overcrowding is a peculiarly rural fault arising from the primitive nature of country dwellings. In too many cases these consist of only a single apartment for each family, a practice fraught with evil physically and morally. Such homes will always be the stoutest enemies to sanitary improvement in themselves and in their consequences, aided in all cases by the natural inertia of "leaving bad alone," and in most by the difficulty in getting better accommodation.

It must never be lost sight of that cleanliness and orderliness in domestic matters is the key to a very large possible improvement in sanitary efficiency quite beyond the reach of sanitary boards and expensive measures. Here is the point where the evil frequently occurs. The Rural Medical Officer of Health for the Merthyr Union states in his report, September, 1874: "I have already stated that fifty per cent. of the deaths were those of children under five years of age, and I would now further say that half of those under five who died were under two years of age, and that with the exception of ten all the others died of maladies whose chief promoting cause is the impurity of the air within and around their dwellings, that impurity being due to two main causes, offensive and unhealthy odours from putrifying house-slops and cesspits, and insufficient ventilation of dwellings."

Sudden changes and complete exposure are the inevitable result of the present system of house construction. In planning the meanest of dwellings in this country, the living apartment ought on no account to communicate directly with the open air. An inner door is a necessity. The space between the inner and outer doors acting as an air lock diminishes the volume of air exposed on opening the door, and thus equalizes the temperature.

As houses become smaller, the difficulties of ventilating them properly increase; the inmates then come in contact with the exchange currents. Draughts, as is well known, are most prevalent in small houses, and are indirectly responsible, year by year, for a considerable proportion of the death rate. The evil is not in the presence of draughts, meaning thereby simply currents of air, but in the proximity of different temperatures acting simultaneously, or almost so, on the body when not prepared for these surroundings. Hence it will always be advantageous to make an opening for the supply of air, if that supply be drawn from a partially equalized temperature. It would be an error to insist on such opening discharging air of a very different temperature from that of the room.

Of equal importance in theory, and much more in practice, is the introduction of an opening to carry off foul air with the products of combustion. No plan could be more objectionable than the present, where rooms are hermetically sealed over the ceiling and half way down the walls.

In designing houses, halls, lobbies, and spaces other than rooms, ought to be looked on as intermediate heating chambers for the air in its route from the exterior to the rooms. A hall, then, ought always to have sufficient permanent ventilation to supply the house at ordinary times with fresh air. In this way the rooms are supplied from a reservoir nearer their own temperature than the external air. This plan will be found to answer for very warm as well as very cold weather. In all houses of any size ventilation flues ought to be made leading from openings in each room to the external air, and discharging at an elevated point.

When it is remembered that in this country rain as a rule comes in moderate quantities, and at moderate intervals, the influence of the top soil must be admitted to be great, especially in the drier parts of the year. The fineness of this top soil retarding filtration re-exposes the water to evaporation. This is also true for all plants; thus the more vegetable life there is in a district, the greater quantity of water will be returned to the atmosphere.

Not only does a much less quantity of moisture, as river water, drain from well wooded districts, but a much greater quantity condenses either as rain or dew. Meadow land is as healthy as any, and secures a greater circulation through the soil; that is, a more favourable condition, if the subsoil be drained, for growth.

The very properties which make gravel a dry subsoil when drained render it a capacious reservoir when undrained. It is obvious, without quoting detailed proof, that the nearer this subsoil water is to the surface the more injurious it is to plant and animal life. Dr. Buchanan first pointed out the injurious effects of subsoil water on health in these words: "That the drying of the soil which has in most cases accompanied the laying of main sewers in the improved towns has led to the diminution more or less of phthisis." We cannot object to these cases being for towns, and thus inapplicable to rural districts, for the same conditions hold in both with respect to subsoil drainage. It must be remembered, however, that, although the causes may be the same in town and country, the results, as shown by fevers, &c., may be different.

The fact of consumption in many rural districts of wide extent being local and common is well known, and points suspiciously to the defective natural drainage of the district.

Drainage, like charity, ought always to begin at home, and very few homes can dispense with this draining. A dry rubble, rough-built drain carried round the outside of a house, just beyond the foundations, will be found to protect buildings from damp most effectively. Such a drain can be laid in on building the foundations, care being taken to provide a proper outlet. Houses on hillsides require this draining as much as those on level ground.

We will now consider briefly the question of water supply to rural districts. These are on the whole in a worse position than towns. Wells or streams supplying 200, 300, and 500 gallons per day are the exception, and not the rule. If investigated, the effective rural supply—that is, the quantity available from existing sources without upsetting present arrangements—would be found to be very low indeed. Nor is this deficiency so easily supplied to rural districts as to towns; for each house or each few necessitate an independent source of supply.

Everywhere there is a tendency to centralize. A house has a greater chance of being built beside another than by itself. While a village is growing, the rate of increase grows with its size. In exactly the same proportion do the evils and objections to this independent system grow. The risk of contamination becomes very great. It has been frequently ascertained that the death-rate for communities emerging from rural to urban existence grows faster than in the municipal towns. The two main causes of this are, deficient water supply and sanitary negligence, with, worst of all, an ungodly connection between the two.

Many villages have been provided with excellent supplies from small springs and streams, intercepted by an earthenware pipe (at Kirkinlullock 9″ to 12″ diameter), leaving the joints open and packed with dry stone and clean gravel. When passing unsuitable streams these joints are luted with clay and carefully protected.

Many good supplies of water from systems of land drains are thrown away, partly owing to a prejudice that water from subsoil drains is unfit for domestic use, and partly from the inconvenient level of the supply: a covered reserve tank is never thought of. In this country these are almost unknown; while in many Continental states every house is provided with such an appliance. In this country, if met with at all, it is in high-class houses, and not in those where most wanted. It is generally reckoned that a tank ought to contain a quarter the annual rainfall over the catchment area to give a fairly continuous supply.

Wells, although the greatest acquisition to a house, are frequently fruitful sources of danger; this source, now much better known, is sewage contamination. By gross inattention to the carriage of sewage, a large proportion of valuable wells are rendered dangerous, all the more so that it has not yet become a national characteristic to criticise water as we do wine and ale.

After a time, in small springs and wells, contamination tends to become chronic; this has escaped notice, although all are ready to admit the capacity foul water has for contaminating pure, especially if the impurities are organic. Catchwaters, Spillwaters, and Sinks near pumps, are the source of untold disease, and ought to be most carefully seen to.

The mere fact of a cesspool being at a lower level than an adjacent well, is not at all a guarantee that the well is not contaminated by its sewage. In hot and dry weather there is a constant circulation from the lower strata to the higher—this is no theory, but observed fact—as moisture is abstracted from the exposed surfaces by heat, currents are set up, governed by the peculiar laws of molecular attractions.

Cesspools being wrong in principle, however much their construction may be improved or supervised, can never be a proper solution of this difficult question.

Dr. Guy, at a deputation from the Social Science Congress, which waited on Mr. Sclater Booth, said that the most important step to take would be to render it a positive misdemeanour for any person to construct cesspools of the ordinary kind *anywhere* in rural districts. What ought to be affirmed is, that a district dependent on wells (percolation) for its water supply ought on no account to use cesspools as a means of disposing of its sewage, and, *vice versa*, that where cesspools exist, an imported water supply is a necessity.

The man who would sink a cesspit ten yards from a well, takes a very great liberty with the lives of those about him. This is eminently one of those questions on which the public require a security against rash and unprincipled, or most likely thoughtless, persons establishing a permanent source of disease. On the other hand, I think it is possible to go too far in the prohibitive direction. To make it a positive misdemeanour, with Dr. Guy, for any person to construct cesspools of the ordinary kind *anywhere* in *rural districts* would be not only unjust but absurd, and if enforced would lead to more offensive, and it is to be hoped more ingenious, devices than cesspools of the ordinary kind, safely beyond the scope of such a law.

This question of cesspools is continually cropping up, especially in suburban districts, where the houses as a rule have a large proportion of ground. Such districts generally are in communication with a "*water supply*," but not with a system of sewers. Water-mains ramify quicker than sewers, for the simple reason that sewage first presses itself on our attention through the water we use, and after a water supply is obtained it is generally several years before it presents itself again in any observable form.

To sum up. In rural districts supervision ought to be exercised over even isolated houses as to the disposal of sewage, especially as to whether cesspools are admissible or not. As a village developes a supply of water ought to come before a system of sewers, and in not a few cases—depending of course on the nature of the soil—the introduction of a water supply will solve the difficulty in all probability till the village is sufficiently developed to warrant a proper system of drainage.

Drains are porous channels to carry off the surplus land water, while sewers are, or ought to be, perfectly impervious channels for the conveyance of sewage. To make drains act as sewers is, as we have seen, highly dangerous where the drains, instead of giving off surplus water, absorb liquid sewage during drought.

Much has been written on the advantages of a double system of channels—one pervious, the other impervious. In towns the only objection, and that will not long be one, is the great cost of a double system of channels. Those who are conversant with drainage will remember that along the outside of all sewers, however carefully filled up, there is a great weeping or draining of land water, nature carrying out the separate system on her own account.

We have already seen how evils from negligence in sanitary matters press themselves home on us through the water we drink, the air we breathe, and the contacts we make; and we will now proceed to consider the disposal and treatment of sewage as most applicable to our case.

The dry earth system has now been in successful use for many years at a large number of small towns and villages, and with the best of results where the scavenging arrangements are good. The cost of working this system in a village of about 500 inhabitants is almost balanced by the sale of the manure, which is worth about £1 per ton. Local authority is a first necessity in all cases of sanitary reform, notably so in the dry earth system, where, in addition to the initiation of the scheme, there is the constant detail of working.

It is hard to see how so rudimentary an operation as sewage farming cannot be attempted on a small scale. Yet this is the opinion of many in power.

Land, in the first place, must not be surcharged with sewage; if so, the root crops rot, and the grass too, after the first crop goes off. Sewage farming, carried on purely for its agricultural value, is the only permanently healthy condition of sewage utilization. In this country few farm crops require the application of sewage oftener than six times per season, many not so often. Garden produce, such as cabbage, absorbs more than three times this quantity, and such cultivation is thus very suitable for sewage farming.

A process fortunately goes on known now as intermittent down-ward filtration between the application of successive charges of sewage. On sewage being distributed over a plot by its gravity, it finds its way downwards toward the subsoil drains at a depth of four or five feet. As it descends it gets filtered and oxidised. Such a charge draws after it air, and when all the fluid has passed into the subsoil drains the soil is left charged with air sucked in by the descending fluid. In this way the land performs the office of a gigantic lung in bringing the impure matter in very close, chemically close, contact with the oxygen of the air.

It is this property of the soil, then, which gives sewage farming all the elasticity it has; but the greatest care must be exercised in applying sewage, so as not to sicken the growth. This is hard. Additional land is always acquired to equalize the consumption at unfavourable seasons.

There is, it seems to me, a prosperous future for sewage farming on a small scale in rural districts. Every cottager ought to be impressed with the necessity of saving and applying where possible liquid sewage to his small plot; while the farmer must be educated to exert his ingenuity as to its application. No such wasters as cesspools ought to be allowed at farm steadings. Mr. Mechi's life labour has been the advocacy of liquid manure, and it is well known how successfully he has accomplished his aim.

At how few steadings do you find, not a liquid manure distributor, but any attention whatever paid to this part of the manure. If this subject were followed out as far as our experience warrants, how many cesspools, drains, and pools, evidences of waste and centres of offensive odours in rural districts, would vanish?

I have ventured to lay additional stress on this point of *liquid manure*, feeling certain that on its recognition by farmers as a valuable practical fertilizer, two-thirds of the sanitary defects in rural districts will be swept away, and to the gain of the agriculturists.

THE CHEMISTRY OF CARBON.

ABSTRACT OF PAPER BY DR. R. OXLAND, F.C.S.

(Read February 5th, 1880.)

UNTIL comparatively a recent period in the history of chemistry it was believed impossible to produce certain substances artificially, hence the terms organic and inorganic chemistry were introduced as a classification of bodies that could be produced artificially and of others which could only be developed by the intervention of vital agency. As now it appears that many, if not all, of these substances can be produced artificially from their primary elements, and as in all cases carbon is an essential constituent of them, the term chemistry of carbon has been substituted for that of organic chemistry.

Carbon is believed to be an elementary substance; its existence as an element was first determined by Lavoisier. Our knowledge of matter is so limited that we cannot venture to estimate the relative proportions of the elementary substances existing in the earth. Carbon appears to be one of the most abundant, but at the same time one of the most remarkable, being possessed of the most wonderfully diverse and seemingly contradictory properties. It is the most Protean-like of all the elements. It is the blackest, it is the most white, the most destructive and the most productive, the hardest and the softest, the best abrader of surfaces, and the best lubricator. It is the most permanent, the most changeable and changing body in existence.

The mode of production of carbon by the destructive distillation of wood was described, and the origin of the carbon traced to the atmosphere from which, by the vitality of the tree, it had been extracted, at the same time that the carbon native to the soil in which the tree grew was increased in quantity by the same agency. The atmosphere, therefore, proves to be the great storehouse of carbon in an invisible form. These facts lead to the consideration of the history of carbon. It is so plainly written in the archives of nature that those who run may read, that carbon was as essential to the vitality of the earliest history of the earth as it is now.

The great deposits of coal on the earth's surface present evidence of the vital action of carbon; but we also find it mineralized in other forms, as in the rocks of our neighbourhood. Our limestones contain 12 per cent. of carbon, also of vital origin. We can hardly venture to say that any form of carbon accessible to man has yet been found that does not bear traces of organic origin.

At Sulphur Bank, in California, the occurrence of carbon compounds, together with boron, silicon, and sulphur, are suggestive of community if not identity of origin; and the occurrence of large supplies of carbonic acid issuing from fissures in mineral veins where the above-mentioned minerals, together with gold, silver, and other metals are deposited, are further corroborative of this view of the case.

Carbon exists in the amorphous form black and opaque, but it also occurs splendidly crystallized, as in the diamond, and of extreme hardness. It is found as bort or black diamond equally hard, but amorphous as plumbago and as anthracite.

Diamonds are remarkable as being the most highly valued substances known. They so rarely occur pure and perfectly crystallized that they have assumed almost fabulous importance. The Koh-i-noor belonging to the English crown, less than an ounce in weight, is of the value of more than £190,000. Its history, extending back to 56 B.C., is most romantic. The uncrystallized diamond has lately obtained considerable value for industrial purposes, for cutting millstones for grinding corn, for driving tunnels for railways, and for the working of mines, its hardness remarkably well adapting it for boring holes in rocks for blasting purposes, rapidity of operation being greatly promoted thereby.

Some of the most important of the combinations of carbon with oxygen were described, as well as some of those with hydrogen, having especial reference to the illustration of the fact that these compounds may be regarded in the form of molecular elements, which will require consideration in some future lecture for satisfactory development.

Finally some remarks were made on the recently reported discovery of the method of making diamonds by Mactear of Glasgow, but their production so as to interfere with the value of natural diamonds was considered as exceedingly improbable.

THE IRISH BARDS.

SYLLABUS OF PAPER BY MR. W. POWER.

(Read February 12th, 1880.)

The Irish bards, ancient. Their position in the state. The distinguishing colours of their dress. The decline of the bards. Revival of Bardic poetry and music. The modern bards.

EXCHANGE.

ABSTRACT OF PAPER BY MR. A. P. PROWSE.

(Read February 19th, 1880.)

The need of some medium of exchange is soon felt by the most uncivilized savage, and the demand for it is a sign that he is emerging from a state of barbarism to one of progress. No better evidence could be given of the superior physical and intellectual capacities with which man is endowed. No sooner is this medium obtained than it is seen to influence, in a very marked degree, his intercourse with his fellows—general and commercial relations gradually spring up, and continue to increase. After considering that a medium must serve as a means of effecting a valuation of commodities, and by its own intrinsic value afford a guarantee of the proper value of other commodities, and also may be exchanged for them, it was shown that nothing could fulfil the necessary conditions required so simply and firmly as the substances known as the precious metals. The nature of gold and silver were then described; and whilst it was admitted that gold was the most perfect and absolutely superior to all other metals for this purpose, yet silver was also indispensable to a proper circulating medium. The ever fluctuating influences which affect commercial exchanges were only touched upon to observe, that whilst there was always scope for the exercise of intelligence, energy, industry, and economy, no science could be framed by which future fluctuations could be foreseen and forestalled. The various monetary systems of the world were then cursorily reviewed, for the purpose of urging that the present monetary babel should be superseded by a universal circulating medium. It was next pointed out in what countries respectively the gold valuation prevailed—the double valuation, gold and silver, prevailed—and the silver valuation prevailed; and the advantages and disadvantages of the single and double standards were discussed. It was admitted that the gold valuation had worked well in England; but it was believed by many high authorities that the double standard would have worked better, and it was contended with some energy that the demonetization of silver, and the removal of it as a money standard, would be fraught with danger and injury to the best interests of mankind, in fact it would be the destruction of a large portion of the capital of the world. The measures to be adopted in order to assimilate the various monetary systems, with a view to the gradual introduction and adoption of a universal coinage, were then stated, and the alleged difficulties were mentioned as few, and not insurmountable. The paper concluded with an urgent appeal in favour of a universal measure of coins and weights, &c., which, next to a universal language, would be the greatest blessing to all nations.

SHAKESPEARE'S CORIOLANUS.

SYLLABUS OF PAPER BY MR. W. ADAMS.

(Read February 26th, 1880.)

LEGEND from which the principal incidents of the play are taken. Lecture on the play, not on the legend. Criticisms by Ulrici, Gervinus, and Vichoff. Sketch of play, with special reference to the development of the principal characters, and the way in which its display is affected by the minor characters. Remarks on the leading thoughts of the poet.

ROME IN THE SECOND CENTURY A.D.

ABSTRACT OF LECTURE BY THE REV. J. ERSKINE RISK, M.A.

(Read March 4th, 1880.)

The paper mostly treated of Trajan's reign, as embracing the chief characteristics of the age, both in its progress and decline. Trajan's dislike of trade guilds, or *hetæriæ;* his magnificent buildings and Column. Analogue to latter on Place Vendôme, Paris, with column now surmounted by the figure of Napoleon Bonaparte as Consul, but formerly by that of Napoleon as Emperor. Trajan's legislation and noble appearance. Poetic and prose writers of Flavian era; effects of Flavian professorial system of training on closeness of thought of poetry of the time. Examples. Juvenal and Persius, Statius and Ovid, compared to show results in Flavian era. Literary correspondence of the time, especially that of Pliny, contains the fairest existing portraiture of Roman gentleman and manners of higher class society. The haunted house at Athens, as described by the younger Pliny, and striking resemblance of the narrative to modern ghost stories. Rénan, in his own peculiar fashion in which he refers to everything opposed to his views as contrary to progress, bears testimony to the true character of Pliny's religious views,* such as they were, and their real dissimilarity to those of the Mill school. "Les libres penseurs, innombrables, au premier siècle avant, et au premier siècle après Jesus Christ, diminuent peu à peu, et disparaissent. . . . La science se teint de jour en jour. . . . Plini le jeune croît à de pueriles histoires de revenants. Epictete veut que l'on pratique le culte établi."† Euthanasia. Popular acceptance of suicide in Pliny's time, and even to a certain extent by Pliny himself, not as a light undertaking, but as the result of careful reasoning on what he might deem the facts; and comparison of this result with the voice of Christendom and the conclusions of really accurate thinkers in modern times. See Ep. i. 12; iii. 5: "To choose between life and death," says Pliny, "according to the guidance of reason, is the mark of a great mind."* Voluptuousness and coarseness of the age, and consequent decline of intellectual vigour at Rome, amidst the growing introduction of the licence of the camp into the halls of Italian nobles, aided even by the example of the Emperor himself. Contrast of prevailing tone with pursuits of a *dilettante* like Spurinna, as described by Pliny, junior; and still more with genuine hard work of a literary man like Pliny the elder. Remarks on prevalent taste for splendid buildings, and little comparative appreciation of the beauties of nature. Some surviving instances of manliness in a Trajan or a Juvenal. The contrast drawn in the *Panegyric* of Pliny the younger between the feelings of a Domitian and a Trajan on the occasion of the annual taking of the military oath; the perturbation of the former, and the calm self-possession of the latter, "who knows that the oath is everywhere being taken to him, for he too has pledged himself by oath to all the citizens." Pliny and the Christians, and his request for instructions how to deal with them; with his testimony to their general innocence and religious observances, but unflinching adherence to what he deemed a superstition and disloyalty to the Emperor and his *cultus*. Trajan's instructions to suppress anything like an *hetæria*, or brotherhood, but not to seek for informations, and above all to reject anonymous denunciations, as contrary to the spirit of his government. Gradual transition to Christianity; decay of old beliefs, and preparation almost imperceptibly made for substitution of a nobler and manly faith, as brought to its triumph in the fourth century, and finally adopted by the young blood of barbarous nations. Progressive decadence of the Empire, and transference of imperial power from true Italian blood to barbarian or semi-barbarian. Summary: Trajan's reign marked by some apparent moral ameliorations, as compared with those of previous emperors; yet the moral sense was blunted, and even Pliny the younger is seen to refer to subjects which cannot bear the light as though they were not so very extraordinary.† Case not similar to that of modern "society" journals; the statements of the latter not founded on fact, like those of Juvenal or Pliny, either in the cases assigned or in the general state of society, but simply rendered plausible by exceptional occurrences. Trajan's government that of "all the talents"—philosophers, legislators, and honourable women combined—and yet not the smallest trace is visible of any idea of representative government, but simply of the devolution of despotic power on the shoulders of the most worthy by the fiat of necessity. Pliny's own words, standing at the foot of Trajan's throne delivering his *Panegyric*, sum up the sentiments of the time, to the great surprise of all who really prize constitutional liberty: "Thou commandest us to be free: well, we shall even be so." ("Jubes esse liberos. Erimus.") It is clear that in the reign of Trajan at least, if not during the lifetime of Cicero, as some say, the Romans had the so-much-talked-of "Imperium et Libertas" of later times. Up to the time of the death of Domitian they could not call their lives their own, and consequently were as prodigal and careless how they cast them away as are some despairing slaves of modern times, who know nothing, fear nothing, and when asked what they will not venture, still answer, "Nothing," if they may only help on the cause of freedom. But on the accession of Trajan all is changed; his panegyrist, Pliny, takes care to tell us so. "Imperium et Libertas" was at length the appanage of the once proud Roman race! They had the "Imperium" in their wide-spread Roman Empire, presided over by their favourite Trajan; and what is more, they had (but at the command of that emperor) their "Libertas," or so-called liberty, too!

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* See *Ep.* iii. 7; v. 16.

† See Rénan's *Les Evangiles*, pp. 405, 6.

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* The Stoic philosophy, however, taught a healthier view of life, and doubtless nerved many who were all but unhinged to bear patiently the pains and sufferings of the present life. And on the whole Pliny fell in with the sounder Stoical view, though sometimes inconsistent.

† See *Ep.* v. 13; viii. 4.

SAMUEL PROUT, ARTIST.

BY MR. J. HINE, F.R.I.B.A.

(Read March 11th, 1880.)

I INVITE the attention of the Society to a review of the life and works of one of the greatest artists of the picturesque that Plymouth, or indeed England, has ever produced.

Had Samuel Prout been mainly a landscape or marine painter, I should not have ventured, in the presence of artists who have made those subjects their special study, to offer this well-deserved and (so far as we as a Society are concerned) this long delayed-tribute of respect to the memory of our distinguished townsman; but Prout's life was one long act of homage to that branch of art to which I give my humble allegiance. The "cloud-capped towers and solemn temples"—the old-world architecture of Europe—constituted the very realm of beauty in which he lived.

Bear with me, therefore, whilst I endeavour to briefly sketch the life and interpret the work of this great devotee of architecture.

I sometimes wonder how it should have happened that Plymouth has produced a larger number of distinguished artists—men quite of the first rank in their profession—than any other town of Great Britain. The nursery was not altogether a good one. There was no initiation here in schools of art or public galleries of painting. It is almost needless to say that artists can be and are made quite independently of such schools and galleries, as the career of Prout, who was almost self-taught, proves; but there can be no doubt of the value of such institutions, on account of the great technical aid they afford to students.

Again, the patronage of art in Plymouth *was* (speaking very guardedly in the past tense) somewhat limited, although it centred in two or three noble families who have always been the consistent patrons of art and of artists in the locality, and who notably did much to encourage Reynolds and introduce him to public notice and fame; as one at least of these families subsequently did (as we shall hereafter see) for Samuel Prout. Outside that small circle, however, the local encouragement artists received was somewhat meagre. Yet they all lived on here—Reynolds, Haydon, Prout, and others—for some years at any rate, until presumably they had exhausted the neighbourhood, and had possibly themselves become exhausted in the effort of extraction.

One can understand indeed the particular attraction which Plymouth possessed for the greatest of our portrait painters. Who, with any knowledge of Southern Devon, that has visited the exhibition of Old Masters at Burlington House this winter, or on previous occasions, but must have recognized in the matchless colouring in the majority of Reynolds' female portraits, that perfect loveliness of complexion which the great artist saw, and which is still seen, in the neighbourhood where he first painted. To apply the words of Shakespeare:

> "Fair, lovely maiden, young and affable;
> More *clear of hue*, and far more beautiful
> Than precious sardonyx or purple rocks."
>
> . . . . .
>
> "'Tis beauty truly blent, whose red and white
> Nature's own sweet and cunning hand laid on:
> Lady, you are the cruel'st she alive,
> If you will lead these graces to the grave,
> And leave the world *no copy*."

But Reynolds *made* the copy, and immortalized Devonshire beauty.

Pleasing as is the *scenery* even in the immediate neighbourhood of Plymouth, it presents, perhaps, fewer striking pictorial effects for the landscape artist's study and delineation than more distant parts of the western counties. The coast is tamer, and the contiguous country less varied and wooded.

But what sort of a place was Plymouth for the development of the special genius of young Prout, who should one day make gleanings of the picturesque in all directions, and paint every lovely street of Europe? Well, Plymouth was not a remarkably picturesque town, even seventy or eighty years ago, although it was much more so than it is now. It was inferior in this respect to Exeter, Dartmouth, and Salisbury, and not to be compared of course with Chester. The fact is the town had been so frightfully battered about by the French in its early days, and the inhabitants were so continually in fear of them and the Spaniards, that those with riches (for the most part) never felt safe enough to build goodly houses for themselves, even within the walls and protected by the four castles, and the town never therefore had the chance of growing into anything like fair architectural importance. But there were many buildings of pictorial and historical interest in Plymouth at the beginning of this century. The solitary Elizabethan houses—like the building in Notte Street which now stands (with miserable modern surroundings) a lonely sentinel and landmark of local history (may its shadow never grow less in our time!)—were then clustered round with other equally quaint houses; storey over storey and gable beyond gable, in something like connected groups, which must have arrested the attention of the youthful Prout, who no doubt saw in them that beauty which is discoverable by the "judgment of the eye."

An artist friend remarked to me the other day, "What a charming street *Looe* Street is." Well, no doubt it was *once;* but it is very much on the *decline*, and nearly all its charm has been destroyed by the moderns. I remember, however, a venerable relative informing me that he spent a delightful honeymoon at an hotel there in 1815, and describing the street as possessing a great deal of architectural interest and respectability.

No doubt at that time, or perhaps a little earlier, it was the most *Proutesque* street in Plymouth, the gradients helping the pictorial effect of gable above gable, and oriel above oriel; the diagonal broken here and there by the horizontal lines of the projecting cornices of the Queen Anne houses, and all the buildings stepping up, as it were, to the quaint old Guildhall—I mean the "James the First" building, which of course should never have been supplanted by the (*then*) New Guildhall.

The large and ever-increasing area of *stuccodom* by which we are now surrounded and afflicted, which has relentlessly swept away, sometimes with barbarous indifference and scorn, nearly all our trees and pleasant places, had not then commenced its revolutionary course; or, to use another simile, the stucco epidemic had not yet broken out when Samuel Prout was a boy here. Now of course it is very interesting to know (and I am sure everybody ought to be aware of the fact, because we are being so constantly reminded of it) that Plymouth is seven times as populous as it was in 1800, and that there are three or four times as many houses now than then; but, speaking here as an artist, I think it would have been better for Plymouth if it had grown with less rapidity, though with more beauty, and if stucco had never been invented. Does any body imagine for a moment that stucco, because there is such a *lot* of it, is an unmixed good? It is very *much* mixed; but I am bold to say that it is *not* an unmixed good, but an unmitigated evil.

Our famous Hoe, of which we are yet so proud, was more picturesque in the time of Prout's boyhood than it is now. The rocks were unblasted; there were fewer level and unbroken walls immediately above the rocks, and furze was growing on the slopes. The Reform Bill was *in nubibus*, and Lord Grey and Lord Russell had not been heard of. It had not therefore yet become necessary to deform the Hoe by scooping alcoves out of the sides, and putting up mural tablets commemorating the services of those gentlemen. Strange that a national measure supported by two noblemen not distantly identified with Plymouth should have been commemorated, and the glorious traditions and history of the place utterly ignored. But I think since then we have learnt to value local memories more. Our Institution has shown this; our Plymouth literature has shown this; our public buildings (though I say it) have shown this.

The view from the Hoe was more perfectly pleasing then than it is now perhaps. At any rate, St. Nicholas Island was less barrack-like, and the contour of the little island was more picturesque; so also was that of the Bovisand Heights, which were then without any forts or high walls. On the other hand, the loveliness of Mount Edgecumbe must, I think, have increased with the growth of its woods; and certainly Penlee Point, where there were *no* woods, is more beautiful now than it was then.

In the exhibition of Prout's drawings, which has been held this year in New Bond Street, there was a fine drawing (No. 19) representing a "noble street-scene at Antwerp, requiring," as Mr. Ruskin in his *Notes* says, "no effort to exalt, no artifice to conceal, a single feature of it. Pure fact—the stately houses, and the simple market, and the divine tower." Mr. Ruskin adds: "You would like advertisements all along the house-fronts, wouldn't you? and a tramway up the street, and a railway under it, and a gasometer at the end of it instead of a cathedral; now, wouldn't you?"

We have lately had an expression of public opinion in Plymouth regarding certain contemplated changes, which are designated Plymouth Hoe Improvements; and one is almost tempted to ask in the same vein as Mr. Ruskin, and with no interests beyond those which are artistic, "Don't you feel that there is a great deal required to be *done* to the Hoe?—all the rough irregularities of the place smoothed off; all the footpaths nicely asphalted, and the roadways pitch-paved, and a tramway laid from the western entrance right along the lower drive, and terminating at the Great Western Docks? And especially don't you feel the necessity of a high-level pier (the higher the better) running right out into the sea, as straight as an arrow, and more than half a mile long? Don't you feel that all this is wanted, since nature has done so much and art so little for the Hoe?"

Such is, and such *was*, Plymouth, the honoured birthplace of Samuel Prout, the great artist of the picturesque.

I do not know that he troubled himself very much about his ancestry; he was a gentle, unpretentious man; but those who *have* taken the pains to investigate the matter have been able clearly to prove that he belonged to a very ancient and even renowned Devonshire family, which has been traced back to Baron de Prout or Prouz, who came over with William the Conqueror. The Prouzes had their castle at Gidleigh, on the eastern border of Dartmoor, and according to Risdon most of them were called William from the first Norman line to the reign of Edward II. One Sir William Prouz ordained by his will to be buried among his ancestors at Lustleigh, but his executors interred him at *Holberton*. Some time after the funeral it came to the knowledge of his daughter, the Lady Alice Mules, that the will had not been performed; she therefore petitioned the then Bishop of Exeter that the corpse might be taken up and buried at Lustleigh. The petition was granted, and the body exhumed and re-interred. From some branches of the Prouz family, says Risdon, "are sprung divers dignous houses;" whilst of another branch he says, "It continueth in worshipful rank, though incomparable to its ancestry in title and estate."

I do not know from which branch our hero was descended, but there can be no doubt that *his* great glory was that he *painted* to perfection "*divers dignous houses.*"

There are monuments to the Prouzes at Lustleigh.

I have not been able to ascertain when the Prouts first settled in Plymouth. The artist's father, as I have been given to understand, formerly in affluent circumstances, was eventually engaged in some way of trade—in an extensive clothing establishment of the town. He was a man of much individuality and power of mind, as one may judge from a fine portrait of him by Brockedon in the possession of the family; but he possessed little of his son's facial delicacy and refinement, and was a much more muscular and powerfully-built man. He (Prout, sen.) married Miss Cater, the daughter of a large shipbuilder and merchant of the town, at whose house the celebrated and eccentric George Whitefield was entertained when on his visits, which were frequent, to Plymouth. Samuel Prout was born September 17th, 1783. From very early childhood his father intended him for business; "but," says Mr. Ruskin, in an article which appeared in the *Art Journal* about three years before the artist's death, "although the delicate health of the child might have appeared likely to induce a languid acquiescence in his parent's wish, the love of drawing occupied every leisure hour, and at last trespassed upon every other occupation. Reproofs were affectionately repeated, and every effort made to dissuade the boy from what was considered an idle amusement, but it was soon discovered that opposition was unavailing, and the attachment too strong to be checked. It might perhaps have been otherwise but for some rays of encouragement received from the observant kindness of his first schoolmaster. To watch the direction of the little hand when it wandered from its task, to draw the culprit to him with a smile instead of a reproof, to set him on the high stool beside his desk and stimulate him by the loan of his own pen to a more patient and elaborate study of the child's usual subject—his favourite cat—was a modification of preceptorial care as easy as it was wise; but it perhaps had more influence on the mind and after-life of the boy than all the rest of his education together."

"Such happy though rare interludes in school hours, and occasional attempts at home, usually from the carts and horses which stopped at a public-house opposite, began the studentship of the young artist before he quitted his pinafore. An unhappy accident which happened about the same time, and which farther enfeebled his health, rendered it still less advisable to interfere with his beloved occupation." "We have heard," adds Mr. Ruskin, who was on terms of the warmest friendship and intimacy with Prout, "we have heard the painter express with a melancholy smile the distinct recollection remaining with him of a burning autumn morning on which he sallied forth alone" (from the streets of Plymouth), "himself some four autumns old, armed with a hooked stick, to gather nuts. Unrestrainable alike with pencil or with crook, he was found by a farmer towards the close of the day lying moaning under a hedge, prostrated by a sunstroke, and was brought home insensible. From that day forward he was subject to attacks of violent pain in the head, recurring at short intervals, and until within the last ten or twelve years of his life not a week passed without one or two days of absolute confinement to his room or to his bed." To use Prout's own words towards the close of his career, "I have to endure a great fight of affliction; can I therefore be sufficiently thankful for the merciful gift of a *buoyant spirit?*"

This buoyancy of spirit was one of the most remarkable elements of his character. It never left him when in the acutest suffering; and when free from pain it showed itself in a joyous brightness, amounting sometimes to hilarity.

It has been mentioned to me by his daughter (Miss Prout), to whom I am under obligations for kindly giving me many interesting facts and reminiscences of her father's life, that on one occasion when Prout, Haydon, and Eastlake were associated together in lodgings in London (shortly after their first meeting there), the mirth of the trio, provoked by a portrait or caricature which Haydon had made of Eastlake, became so uproarious that the landlady felt it necessary to interfere, and threaten the party with something like summary dismissal if they did not desist their noise. But I must not anticipate. One of the earliest associates, playmates, and fellow-students of Prout was Benjamin Haydon, whose father was a bookseller in Pike Street. Haydon was three years younger than Prout, and they both went to the Plymouth Grammar School, of which Dr. Bidlake was then master. He was himself a painter, as well as poet and musician. His most important published poem is entitled "The Year." He is said to have possessed the merit of gathering around him minds of still larger power than his own, and giving them an impulse which directed their course in life. That young Prout was a favourite pupil of his cannot, I think, be doubted. The family preserve with reverence a fine life-size portrait, it is thought by Opie, of Samuel Prout, taken in Dr. Bidlake's study. He is looking up with joyous face and quick intelligence, as if struck by some effect discernible through the mullioned window of the old Tudor Grammar School, and his whole expression seems to give promise of the rich future that will open up to him.

With his master he made many charming excursions, but it was more often with his schoolfellow Haydon that his first marine and landscape studies were made; and yet how different the two youths! Prout, always plodding and diligent, imaginative, and yet trying to copy with simple truth and honesty what struck him as beautiful or picturesque in nature; Haydon, equally imaginative, but impatient, impulsive, restless, not calm and steady enough to follow closely and master the details of a subject, but endeavouring to grasp the *whole* at a bound, and often retreating disappointed. The manhood of each must have been very much the counterpart of the boyhood. Prout, ever steadily pressing on to perfection in his own beautiful and distinct field of art, and *reaching* the goal; Haydon, with his great and noble aims, constantly missing the mark, and the ambitions of his life becoming more and more hopeless and visionary.

> "Poor wanderer on a stormy sea!
> From wave to wave oft driven;
> And fancy's flash, and reason's ray,
> Served but to light the *troubled* way."

There is an impression abroad that Prout *began* by drawing landscapes, but I have it on good authority that this was not so. Marine subjects were his first love. He had great fondness for drawing boats at the Dockyard, and also at the Barbican. His first finished water-colour drawing represented a figure on a rock looking into the water. This was given to Dr. Hawker, who was a great friend of his father's, and on the death of the doctor was returned to Mr. Prout's family. Mr. Ruskin mentions the impression the wreck of the *Dutton*, East Indiaman, on the rocks under the Citadel, left on Prout's mind: "The crew were saved by the personal courage of Sir Edward Pellew, afterwards Lord Exmouth. The wreck held together for many hours under the cliff, rolling to and fro as the surges struck her. Haydon and Prout sat on the rocks and watched her vanish, fragment by fragment, into the gnashing foam. Both were equally awe-struck, and both resolved to paint the scene on the morrow. Both," says Ruskin, "failed; but Haydon, incapable of remaining loyal to the majesty he had seen, lost himself in thunder and lightning. Prout struggled to some resemblance of the scene, and the effect on his mind was never effaced."

Young Prout was a musician (self-taught) as well as painter; he afterwards became master of the organ, the piano, and the flute; and in these early days, when not out sketching alone, or with Dr. Bidlake or Haydon, he would frequently be seen going up to St. Andrew's Church to play on the organ—eighty years ago almost, if not quite, the only one in the town. His imagination and taste even here therefore were being cultivated through more than one channel, and many a bright day-dream may we imagine he had as his fingers glided over the keys of the organ in our grand old church.

Nor was he without friends in Plymouth beyond the two already named. The Earl of Mount Edgcumbe, who had been brought acquainted with the talents of the boy, invited him to Mount Edgcumbe House to see and examine for himself the paintings and pictures, and the other works of art there to be found; and the Earl became so interested in the young artist, and would have him so frequently with him, that Samuel Prout at last got the nickname of "the Earl's puppy dog;" *not*, we may be quite sure, in the sense in which Boswell was considered the cur of Johnson, for the artist was too gentle, and honest, and true to himself for that; but we can quite understand how grateful he would be for the opportunity afforded him for a very large accession of new ideas. Not the least striking object to Prout at Mount Edgcumbe must have been the house itself—then more strictly Tudor than now, with its bold and picturesque granite doorways, and mullioned and transomed windows, and its noble octagonal wings. But he had not then the skill to draw masonry with comparatively so much elaboration, and his knowledge of perspective was at that time very imperfect.

I have said that Prout was self-taught, and yet of course he was always learning, and frequently gleaning knowledge from those whom he met who were acquainted with art. Mr. Britton, the antiquary, says he received a few regular lessons from a Mr. Williams, who was a drawing-master of the town; and Ruskin mentions a Mr. Payne, an engineer in the Citadel, as the only one at that time who practised the art of water-colour drawing at Plymouth, who, although his drawings were feeble and mannered in the extreme, obtained some reputation. Prout probably knew him; but one of the young artist's best friends and counsellors was the excellent and gentle Ambrose Bowden Johns, whom many yet living remember. He was seven years older than Prout; had been apprenticed when a boy to the bookseller Haydon, and received his first artistic inspirations at Port Eliot, where he had been sent to arrange a collection of books. He was a great authority on art in Plymouth, and through a long life had become acquainted with many eminent artists. Especially was he presumed to know something about every artist who had ever sprung from this neighbourhood. "Now *do* tell us, Mr. Johns," said a visitor to him one day, "what sort of a looking man was Sir Joshua? What was he like?" And the good old gentleman could only protest, with every disposition to oblige, "But, my dear sir, I never *saw* him."

But as to Prout and Mr. Johns. The young artist's very earliest works were chosen, as I have said, from marine subjects, and he afterwards tried his hand at landscape. He wished to be a landscape painter, and made many adventures in the neighbourhood. On returning from one of these tours, he called on Mr. Johns with his portfolio in his hand. Johns asked him how many sketches he had made, and what success he had met with. Prout, bursting into tears, and wringing his hands with grief, replied, "Oh, Mr. Johns, I shall never make a painter as long as I live!" Johns then examined his sketches, and noticing the power shown in the drawing of old cottages and mills, said, "If you won't make a landscape painter you will make a painter of architecture, and I would advise you to keep to *that.*" Encouraged by this, he went away, rejoicing that there was still a field open to him in art. This interesting circumstance was mentioned by Mr. Johns to Mr. Philip Mitchell.

"Whole days, from dawn till night," says Ruskin, "he devoted to the study of the peculiar objects of his early interest—the ivy-mantled bridges, mossy water-mills, and rock-built cottages, which characterise the valley scenery of Devon. In spite of every disadvantage, the strong love of truth and the instinctive perception of the chief points of shade and characters of form on which his favourite effects mainly depended, enabled him not only to obtain an accumulated store of memoranda, afterwards valuable, but to publish several elementary works which obtained extensive and deserved circulation, and to which many artists now high in reputation have kindly and frankly confessed their early obligations."

The earliest mezzotints and lithographs by Prout which I have seen representing Devon and Cornish subjects are dated 1813, which would be several years after Prout had settled in London, and three years after his marriage. They must therefore have been reproduced on copper and stone long after the original sketches were made, and I expect they represent some of his earliest drawings of architectural subjects. Most of them are immediately local. Pennycross seems to have been a very favourite resort of the artist, and there is one very charming study, entitled "Near Exeter;" other bits are from South Brent, Hooe, Totnes, Kingswear, then a mediæval village, almost unique.

I cannot but think that these early drawings (notwithstanding the something like contempt with which Britton spoke of them) indicate that Samuel Prout laid HERE the very best foundation for the work he was afterwards to undertake. There are not so many old granite and limestone cottages and manor houses about here as there were in Prout's time; most of them have disappeared, but a few remain; and have you not remarked in these, not only the charm they possess in outline and colour, and light and shade, but the beautiful truthfulness of their construction, and the bold individuality of every stone, and the absence of that foe to the picturesque in architecture—the flush mortar joint? What we *do* see is a dark, open, rugged joint, with moss and wallflowers growing out of the crevices.

These are the subjects Prout got to understand and treat so well in Devonshire, and the same truth and honesty with which he drew our old cottages and bridges, and the same respect he showed for construction in them, characterized his later work when the Streets of Rouen and Nuremburg, the Cathedrals of Antwerp and Strasburg, the Ducal Palace at Venice, and the Coliseum at Rome, were all under his masterful command. The pencil drawing of St. Peter's, at Caen, by Prout, lent me by his daughter, serves to illustrate my meaning to some extent. It is a very fine drawing, though by no means one of his most important works; but it is no mere outline of beautiful but vague and unsubstantial creations, which might do for fairy-land, but a picturesque group of solid buildings, carefully and beautifully drawn with just enough of the architectural details and no more, and just enough of the construction indicated by the individuality given to certain stones to show that the artist *understood* what he was representing.

In 1801 John Britton visited Plymouth on his way to Cornwall for the purpose of seeing places and objects to be noticed and illustrated in his *Beauties of England*, and he became acquainted with Dr. Bidlake, who introduced Prout. The sketches of the humble stone cottages, bits of rockwork, and other rude studies were submitted to Britton, who professed to think little of them ; and yet somewhat cruelly, as it seems to me, he invited the young artist to accompany him through Cornwall, in order to make drawings to be engraved for the *Beauties of England*, of some of the most complicated architectural objects in the county, such as Probus Tower, Truro Church, and the Norman west end of St. Germans old Cathedral. It was, in fact, setting a man who had only as yet mastered the foundation work to undertake all at once the superstructure with its distinctive ornament and technical difficulties ; or telling him to draw the lace collars and cuffs, when he had only just felt his way to the boots.

The expedition proved to a great extent a failure, affording little of the delight anticipated by Prout, but, on the other hand, temporary disappointment.

Prout is described at that time as "a pretty timid youth." As a man he was always small and thin. The first day's walk to St. Germans, through a heavy fall of snow, was not a very favourable beginning for the delicate artist. The village inn is described as a most miserable place—full of smoke, and with bedrooms approached by a flight of stone steps on the outside of the house. Prout's first task the next day was to make a drawing of the well-known Norman end of the church, with the receding doorway and the two towers. "Prout was sadly embarrassed, not knowing where to begin or how to settle the perspective." He worked away, however, before the building for four or five hours ; and the sketch then produced was deemed by the antiquary too inaccurate in proportion and detail for engraving. The next day he made another sketch, which was considered equally unsatisfactory. So they gave up St. Germans and went on to Probus, where the church tower, which is a late Perpendicular structure, is almost covered with elaborate ornament—*quatrefoil* panelling, pinnacled buttresses enriched with crockets and finials, and mullioned and traceried windows. The sketch occupied a day, and though it was afterwards engraved, it was deemed a failure. The Cheesewring, and other objects near Liskeard, were then drawn with more success. They next proceeded to St. Austell, and "thence to Ruan, where they were entertained by Whitaker, the historian. Here five or six extremely picturesque sketches were made, one of which included the church, the vicarage, some cottages mixing with trees, the waters of the river Fal, the moors in the distance, and a fisherman's ragged cot in the foreground, raised against and mixing with a mass of rocks; also a broken boat, with nets, sails, &c., in the foreground." At Truro, Prout was again embarrassed with the elaborate granite work at the church, and with the extent of iron railing around it. Here Britton and Prout parted *pro tem.* (mutually dissatisfied, I fancy, with each other), the antiquary going westward on foot, and the young artist returning to Plymouth by coach.

"In the sequel, however, this connection and those adventures led to events which ultimately crowned the artist with fame and fortune." *

This first visit of Prout to Cornwall strikingly shows his character and disposition. You see he could draw the fisherman's cottage on the Fal and the bits of rock, the fishing boat and the nets; he could do all this *perfectly* because he *understood* what he was about; he *felt* it all; but he could not grasp at a bound the tall and elaborate tower of Probus, or the no less ornate church at Truro.

He might quaff sack "*simple* of itself," as Falstaff says; but as for the "eggs," why Probus is *all* eggs, and not very good ones; but I must not drive this simile too far, or I should say the eggs are not rotten enough for Prout. All the stones are square and true of joint, and the composition is regular, straightforward, and unpicturesque; and he saw more beauty (from his point of view) in the cottages he had left in Devonshire than in this tower which was wanted for Britton's *Beauties of England.* If in after years he had seen Probus tower, or another like it, in Normandy or Brittany, he would never have drawn it but for some accessories and surroundings which would make it Proutesque. He had seen St. Andrew's tower at Plymouth; but even that—though much simpler and finer—did not realize what he wanted, and he probably had never ventured on a sketch of it, though he *had* of the old houses underneath.

At Truro it was even more trying for him. There, again, were the closely-jointed stones, with large flat surfaces of ornament, the symmetrical arrangement of windows and doorways, and an uninteresting skyline. None of the granite masonry was worn or crumbling away as he liked; but all was hard and new, looking as though it had only been done a few years; and then surrounding the building was a large extent of straight and elaborate *iron railing!* At the sight of that iron railing poor Prout burst into tears, *Most* young artists would not have *cried*, but would have used angry words at having been lured from their favourite subjects and haunts to draw some 200 feet "run" of abominable cast iron railings; but Prout was too good and gentle then and throughout life to employ strong language even under the greatest provocation. So he simply wept.

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* From an account of this tour written by Britton after the artist's death.

The tears of Samuel Prout are about shortly to be avenged by the *removal* of the railings.

Prout would never, if he could help it, *see* anything that was vulgar or meretricious; at any rate, he would never paint it. He lived in a world of his own, and that not of the nineteenth century; for he was hardly ever known to draw anything that was not four hundred years old. His old Devonshire cottages, and mills, and bridges all are that. Not so the Probus and Truro buildings by-the-by, which, belonging as they do to the "debased Gothic" period, possess much of the *lifelessness* of modern work.

"I do not know any man," says Ruskin in his *Two Paths*, "who had a sublimer instinct in his treatment of things. He had immense gifts of composition, and could express with a mysteriously effective touch a peculiar delight in broken and old buildings. His drawings have a peculiar character which no other architectural drawings ever possessed, and which no others ever can possess, because all Prout's subjects are being knocked down or restored. There will never be any more Prout drawings."

Prout didn't like restoration, because that word has too often stood, not for preservation, but destruction.

Britton, though so disappointed in the young artist's first efforts, would not let him go. He says: "In the month of May, 1802, he sent me several sketches of Launceston, Tavistock, Oakhampton Castle, and other places, manifesting very considerable improvement in perspective lines, proportions, and architectural details.*

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* *Ruskin* mentions these sketches as creating at the time a sensation in London with lovers of art.

A few of these were engraved for the *Beauties of England*, and others for a small publication called *The Antiquarian and Topographical Cabinet.* After some little negotiation, it was agreed that he should visit London to prosecute his studies as an artist, and he came to reside, board, and lodge with me, in Wilderness Row, Clerkenwell, where he remained about two years. During that time he was employed in copying some of the best sketches and drawings I possessed by Turner, Hearne, Alexander, Mackenzie, Cotman, and others. I introduced him to Northcote, and to Benjamin West, the last of whom gave him most valuable and practical advice on the principles of light and shadow, by making a drawing of a ball or globe, on which was shown all the gradations and attributes of exhibiting rotund bodies on flat surfaces. It was a most valuable lesson given in a few minutes, and accompanied by such theoretical and kind remarks as served to characterise the profound master, and make indelible impression on the mind of the pupil. Prout often referred to this important interview with gratitude and delight. In 1803 and 1804 I employed my young protégé to visit the counties of Cambridge, Essex, and Wilts, to make sketches and studies of buildings, monuments, and scenery. My instructions, both verbal and written, were to be scrupulously accurate in the delineation of architectural and sculptural forms, proportions, and details, to make studies and notes of effects on the spot, also of light and shade. Many of the sketches, drawings, and manuscript notes he then made are now in my possession, and have often been referred to and examined with sincere gratification. Some of the subjects have been engraved for the *Beauties*, and others for the *Architectural Antiquities.* In the year 1805 he returned home, partly on account of his health, as frequent attacks of bilious headache rendered him unfitted to prosecute his studies with ease, and any degree of energy." The young artist appears to have been rather unwilling to leave his native town, but eventually he did, seldom returning. I hope he did not think of Plymouth as the faithless swain did of Chloe—

"My heart still hovering round about you,
I thought I could not live without you;
Now we have lived six months asunder,
How I lived with you is the wonder."

Prout finally left Plymouth to settle in London in 1806 *or* 1807. It will be interesting to Plymothians to know that the responsibilities and anxieties connected with such an important step were lightened by assistance he received from Mr. George Eastlake, our present townsman's grandfather; and it is even of greater interest to us to know that Prout gave lessons in drawing to Mr., afterwards Sir Charles Eastlake, the distinguished president of the Royal Academy. In recognition of Mr. George Eastlake's kindness, Mr. Prout, shortly after his residence in London began, sent him the drawings of Launceston and Tintagel which are on the screen, and kindly lent by Mr. W. Eastlake, and which are curious and pleasing specimens of the artist's early work. The drawing of Launceston (representing one of the noble old gateways of that town which remains to this day, and which I am glad to say is likely to remain) was in the loan collection of drawings to which I have before referred, and Mr. Ruskin in his *Notes* says of it, "Had this drawing been brought to me as an early Turner, I should have looked twice and thrice at it before saying, *No.*"

One of the most important drawings in the collection, and one of the finest Prout ever made—"The Ducal Palace at Venice" was formerly in the artist's native town, and belonged to the late Mr. Wm. H. Hawker, and afterwards to the Rev. Treasurer Hawker; it is now possessed by Lord Coleridge. For engraving *this*, or another drawing illustrating the same subject, Le Keux, the eminent engraver, was paid £1,000.

The first few years of Prout's residence in London were for the most part years of toil and discouragement; but though weak in body, he was strong in resolution; and though modest, he was ambitious. His earliest subjects there, as at Plymouth, appear to have been *marine;* but out of these he glided altogether in a few years.

Three years after he settled in London he "settled in life," as the saying is, not wishing to bear the "ills he had" alone, and not fearing to "fly to others that he knew not of;" but in his case there was nothing to fear, as he had made a very lucky and happy choice. He married in 1810 Elizabeth, then only surviving daughter of Captain Gillespie, a Cornishman, who was a large ship-owner, and who enjoyed almost a monopoly of the trade with the Bahamas.*

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* From the time of his marriage (in 1810) till 1836 he lived at Brixton; from 1836 to 1844 at Hastings; and from 1844 to 1852, the year of his death, at Denmark Hill.

In 1818 began that series of visits to the Continent which resulted in Prout's producing a vast number of drawings, chiefly architectural subjects, representing the most picturesque and impressive mediæval buildings in France, Germany, and Italy, such as no English artist had previously produced, and such as have never since been equalled.

Well for art that he lived and worked in the earlier part of this century, before the desolating march of so-called modern improvement had swept away numberless vestiges of antiquity; before the hand of destruction had dealt its blow at the noblest creations of man, not sparing even the beautiful St. Mark's, at Venice.

The towns of Normandy (where he first made himself acquainted with Continental architecture), which are now almost as modern-looking and uninteresting as our English manufacturing towns, were then full of picturesque scenes and effects such as Prout was prepared to appreciate and enjoy, and which he made peculiarly his own.

Mr. Ruskin, speaking of Rouen at that time, says: "All was unity with itself, and the city lay under its guarding hills, one labyrinth of delight; its grey and fretted towers, misty in their magnificence of height, letting the sky, like blue enamel, through the foiled spaces of their crowns of open work; the walls and gates of its countless churches wardered by saintly groups of solemn statuary; clasped about by wandering stems of sculptured leafage; and crowned by fretted niche and fairy pediment meshed like gossamer with inextricable tracery; many a quaint monument of past times standing to tell its far-off tale in the place from which it has since perished—in the midst of the throng and murmur of those shadowy streets—all grim with jutting props of ebon woodwork, lightened only here and there by a sunbeam glancing down from the scaly backs and points and pyramids of the Norman roofs, or carried out of its narrow range by the gay progress of some snowy cap or scarlet camisole."

Those who know that city now know how very different it is from the city so graphically described by the great word-painter, and as seen by the enthusiastic and impressible artist. Most of the ancient houses have disappeared, and the masonry of the cathedral is fresh and raw from the restorer's hand. Prout saw it at the best time.

"Where each revolving century like the last
Had dropt its dust, and then unnoticed passed."

He knew quite well that no building, however beautiful, could be seen to perfection without the ripeness and mellowness of age; without the slightly fretted or crumbling masonry, and the kindly tints which nature and time alone can bestow. And it was this full ripeness of architectural effect which he knew so well how to do justice to—catching the salient features of outline, mass, and light and shade, laying hold of the grand old masonry just as the sun was glinting down on it.

From time to time excursions were during many years made to the Continent; and France, Germany, the Netherlands, and Italy were ransacked for examples of picturesque ancient architecture, to which almost exclusively he now confined his attention. Abbeville, Strasburg, Antwerp, Ghent, Nuremberg, Neudersdorf, Prague, Venice, Verona, Dresden, and many other places, furnished him with noble subjects, very varied in style, but in his treatment of all of them he shows his greatness in composition.

"The moving and natural crowd, the frank and unforced but intricate grouping, the breadth of inartificial and unexaggerated shadow, these are merits of an order only the more elevated because unobtrusive. Nor is the system of colour," says Ruskin, "less admirable. It is a quality from which the character of his subjects naturally withdraws much of his attention, and of which sometimes that character precludes any high attainment, but nevertheless the truest and happiest association of hues in sun and shade to be found in water colour art (excepting only the studies of Hunt and De Wint) will be found in portions of Prout's more important work." It is only right to say that Mr. Ruskin's opinion of Prout as a *colourist*, expressed in this sentence, and also in his *Modern Painters*, has since undergone some modification, as will be gathered from his "*Notes*" on Mr. Prout's drawings exhibited this year.

But no artist ever had a truer champion than has Prout in the great art critic, who indeed has immortalized by his pen the genius of his friend. The collection of drawings recently brought together by Mr. Ruskin emphasizes his high opinion of Prout, and gives additional fame to the artist. It numbered rather more than a hundred drawings and sketches, but that number represents only a small part of the work to which with unflagging energy, and a nature full of joy and enthusiasm, Prout devoted himself. The majority of the drawings in this collection belong to the family of the artist, and they will shortly be sold at Christie's, when they will either pass into private hands and be virtually lost to the public, or they will be purchased by the nation, as they should be. They are the only artistic memorials left of many noble historical buildings which have been destroyed; the only skeletons remaining of those "sermons in stone," which were made to give joy to the world for ever, but which have been cast aside by this unbelieving and degenerate age.

With a portfolio full of such charming sketches Prout returned from the Continent time after time to his happy home in the unæsthetic suburb of Brixton; and can it be wondered at that his reputation became established, and that his works became sought after? The Duke of Sutherland, the Duke of Norfolk, Earl de Grey (the President of the Institute of Architects), and other noblemen, became his patrons; and through their influence, and that of a now large circle of intimate friends, he had a host of pupils, many of whom reached eminence in their profession. I may mention Smallwood, who was largely engaged by the late Charles Knight to make drawings of Continental buildings for his periodicals; and I should not omit to name Samuel Prout's clever nephew, Skinner Prout. The master was singularly free from professional jealousy, and he had a large and generous opinion of others. His house was the resort of young artists, to whom, and to every one who sought his advice and direction, he was exceedingly kind and communicative.

His method of drawing is best described by himself in an interesting and hitherto unpublished letter appended to this paper, the manuscript of which is in the possession of Mr. William Eastlake. The letter has no date; but as it is headed "Brixton" it must have been written previous to 1836, when Prout went to reside at Hastings.*

It will be noticed that many of Prout's drawings are outlined with the reed pen.

In 1833 was published, *Prout's Sketches in Flanders and Germany;* in 1838 his *Hints on Light, and Shadow, and Composition*, a work to which not a few artists and teachers are much indebted; and in 1839 his *Sketches in France, Switzerland, and Italy*, a large and important work, appeared. *The Landscape Annual*, *The Continental Annual*, and other similar books of the

* See Appendix.

period contain the most charming steel engravings from Prout's drawings. In one of these annuals Barry Cornwall had some lines beginning—

> "Oh, a brave painter art thou, Samuel Prout."

The life of Prout was brimful of good, honest work; and the marvel was he could accomplish so much with his weak bodily frame.* Yet he not only was devoted to his work, but lived not a little in society, and led, I am informed, a less secluded life than has generally been supposed. His society, indeed, was courted by many persons of rank, who could not only appreciate his rare talents as an artist, but his simplicity of character and manners.

During the last twenty years of his life he always breakfasted in his bedroom, seldom coming down before eleven o'clock. This was necessitated by his feeble state of health; but he was in no sense a lazy man, or an idle dreamer. If he was late to rise, he was late to bed, *too* late it was to be feared; but he loved his work, and when once engaged in it he found it difficult to tear himself away from it, and was often in his study up to one and two o'clock in the morning, forgetting, in his buoyancy of spirit and in the enjoyment of his occupation, the strain on his delicate constitution.

It was not destined he should live to advanced old age, nor that he should be laid aside by illness, incapacitating him for work, which, with all his brightness of spirit, he had a great dread of, although he dreaded *not* his departure from earth.

But the silver cord was to be loosed and the golden bowl broken of Samuel Prout's life whilst he was in the full enjoyment of his art, and of the society of his friends.

The "last scene of all," as described to me by his daughter with great tenderness and feeling, after twenty-eight years have passed away, has not (like many an incident in this paper) been made public before.

He had been invited with many literary and artistic celebrities to dine at the house of Mr. Ruskin, senior, at Denmark Hill, on Tuesday, the 9th February, 1852, to keep Mr. John Ruskin's birthday, and to hear a letter from Venice, from the younger Ruskin, who was then in that city.

Mr. Prout had not been well of late, and during the day had been somewhat flurried; but he went. He returned between ten and eleven, and said to his wife, "I 've had such a happy, joyous evening! The letter from Venice was capital." He then went up to his studio, and shortly before midnight engaged in those acts of devotion with which he began and closed every day. He had but just risen from his knees, when he fell in a fit of apoplexy, and in less than an hour his spirit passed away.

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* He suffered from hemorrhage of the lungs.

> Peace to thy shade, and endless rest;
> Blessed in thy genius; in thy love how blessed!
> And blessed that, timely, from these scenes removed,
> Thy soul enjoys more beauty than on earth it loved.

He was sixty-eight years of age.

As may be gathered from one or two expressions I have made use of, Samuel Prout was a religious man. Religion indeed formed such an important element of his character, and is supposed to have influenced his artistic life so much, that I make no apology for mentioning it on this occasion, or for adding a few words more on this view of the subject. His mind was of the meditative and contemplative order.

"There never," say his children, "was a brighter or happier Christian." When at Hastings his parish church was St. Mary's (where, by-the-by, in the Sacrarium Prout's arrangement of colour is still kept up). He regularly went to that church, and the vicar (the Rev. Mr. Vores) used to say, "I always wait for Prout to come in *to light up my church.*"

He loved simple and sincere piety wherever he saw it, and he witnessed very many expressions of it. In the picturesque streets on the Continent, at the sound of the Angelus, at the passing of the Host, at the statue of the Madonna, his emotion was touched (and to some extent his sympathy) by the unaffected homage of the poor peasants and children; but abroad or at home, in his hotel or in his studio, his constant companions were his English Bible and Prayer Book; and with them *he* was *satisfied.*

All the subjects of his pictures point upwards—the lovely street scenes terminating in the tall tower, or the divine spire.

The doves hover about the highest ridges of his roofs, and the loftiest pinnacles of his towers.

He had the most implicit faith in the final article of the Nicene Creed—"I believe in the life of the world to come"—and his own pictures are the faint but beautiful symbols of that celestial city, which he *saw* "as through a glass, darkly."

After the funeral obsequies comes the reading of the will; and many might be disposed to think that the man who had accumulated so much beauty, and given to the world so much that was beautiful, must have amassed great wealth.

Well, if he had covered the walls of London with picturesque advertisements, such as before suggested we should all like to see on the walls of Antwerp; if he had invented (say) a new brimstone match that would go off if you only looked at it; or if he had introduced an Indian pickle (precious article that!), or if he had been a celebrated Anglo-American physician, who had invented a perforated plaster that would cause anybody wearing it to breathe freely for at least 150 years; if he had done any of *these* clever things, it is probable that a short time after his death it would have been recorded in the *Illustrated London News* that his personal estate had been sworn under half a million.

But although it is not strictly or technically correct that Prout made such a large fortune as this, it *is* a fact (and it is no secret, for it is alluded to in Mr. Ruskin's notes) that he died very rich; that is to say, very rich in portfolios of sketches—and *such* sketches!

What were the legacies he left to England and to posterity?

He left to artists the example of a beautiful life, devoted from infancy to old age to the truest interests of art.

He left to the dwellers in towns some of the best lessons on the value of the picturesque that have ever been given, lessons which one day in the far distance they may, perhaps, wake up to the appreciation of.

He left to the literature of history and romance the most vivid architectural scenes and effects.

And he left to an age devoted to commerce and gain the noblest artistic memorials of an age devoted to chivalry and religion.

APPENDIX.

In the north aisle of St. Andrew's, Plymouth, is a marble tablet, with this epitaph—

IN
Memory of
SAMUEL PROUT,
EMINENT IN HIS PROFESSION AS A PAINTER.
Born at Plymouth, September 17th, 1783;
Died deeply lamented at Denmark Hill, Surrey,
February 10th, 1852.

HE WAS A SINCERE AND HUMBLE CHRISTIAN,
RELYING ALONE UPON HIS SAVIOUR.

"Verily, verily, I say unto you, he that believeth on Me hath everlasting life."—St. John xi. 47 verse.

The Rev. Edward S. Prout, of Bridgewater, nephew of the artist, writes: "I have a tiny sketch which he made for us when we were boys, and it illustrates his kindness of heart. During one of the Christmas holidays, when we lived at Camberwell, our cousins (the artist's children) were helping us to make the game called "Schimmell," or "Bell and Hammer," and painted the cards for us. Not being satisfied with the card called "The Inn," they asked their father to draw one, which he did, and painted in his own style. I keep it among my treasures." This tiny drawing is characteristic, and perfect in its way. It was evidently made from a recollection of the "White Hart" at Launceston.

The sale after the artist's death of a portion of Prout's drawings and sketches, chiefly the latter, realized £1,788.

At the sale referred to in this paper as taking place on the 12th of April, 1880, the following are some of the prices obtained: "Albert Durer's Well, Nuremburg," £89 5s.; "Old Church at Tours, used as a Corn Market," £90 6s.; "Portsmouth: the Troop-ship," from the Farnley Hall collection, £120 15s.; "Chartres Cathedral," £74 11s.; "The Temple of Mars, Rome," £96 12s.; "The Eddystone Lighthouse," a pencil drawing, £17.

LETTERS.*

London, 26th September, 1803.

Very dear Sir,—I received yours of the 9th inst. just as I was leaving town, and have now taken the first opportunity to answer it. Mr. Britton promised to take me on his first journey; but he made a Mrs. Britton his companion. Since that I have been over part of Essex, where we found many fine subjects for sketching; but was most delighted with the very extensive and beautiful prospects which were seen on every side.

. . . .

Will you enquire if Mr. Haydon has received the manuscripts, &c., which Mr. Britton returned? to whom, with Benjamin, give my respects.

Best and most respectful compliments to *Mr. Bidlake*, Williams, Howard, Hill, &c.

How glad I should be positively to say as to my return this winter; but from the appearance of present circumstances it is not likely. I am, dear Sir, yours sincerely,

S. Prout.

At Mr. *Thatcher's*, not *Thrasher's*.

Mr. A. B. Johns, Bookseller, Pike Street, Plymouth.

London, March 14th, 1804.

Dear Sir,—It was my intention to have written you a long letter, principally about painting, as you requested; but for want of time I shall be under the necessity of stating a few particulars as briefly as possible.

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* For these I have to thank Miss Johns, Mr. Eastlake, and Mr. E. Opie, who possess the originals.—J. H.

I have made a small collection of Plaisters, and hope in a short time to pack them up for Plymouth.*

Mr. Britton cannot conveniently spare me a Turner to copy for the present, as he is arranging his collection, so that patience must help you out a little longer.

I have made many enquiries after Morland—have seen two or three, but not equal to those we saw in Princes Street. For the same size, and not equal in colouring or subject, twenty to thirty guineas. Mr. Arnold has promised to look out for you as well as myself, and, it may be, a subject to your wishes can be purchased for twelve or fifteen guineas. I cannot say for less; connoisseurs are *Morland-mad.*†

You have not said if the impressions from Mr. Saunders's plate arrived safe. I should thank you, when an opportunity offers, to send me an impression, as I wish to realize the features of him whose conversation I so frequently enjoyed.

I have been with Mr. Arnold, who is lately *very much* improved, especially in colouring. The principal picture he has painted for the exhibition is one of the best landscapes I ever saw; the subject is Celadon and Amelia, from Thompson. The figures are small, but the composition is equal, if not superior, to Wilson. I have enquired his prices, and mentioned a few particulars about his painting a picture for you. I told him that your principal object in view was *improvement.* He is very desirous to paint you one, and says that if you are willing he will finish it in his best style, and unless 'tis a picture with which he is well pleased, he will not send it. For a three-quarter size, ten guineas; kit-cat, twelve guineas. You must not suppose these are his regular prices. No; they are nearly double. It is under the consideration of your being a beginner, and a few particulars which I have mentioned, and for which I am persuaded you will pardon me. I have not represented the artists of Plymouth as persons of considerable property, but enough for the present. Should you agree to his terms, and wish to have a painting, I would advise you to say immediately. Permit me also to advise you to give him twelve guineas for the three-quarter size, and have more figures, or what you particularly want.

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* These were figures from the antique, which Prout bought in London at Johns's request. In a subsequent letter he gives an account of his outlay on them, says he has "indulged" himself "with a coach, as it would not be in my power, from ill health, to attend to your wishes" otherwise; and he adds that he has borrowed the money to pay for the Plaisters till the "return of post."

† "Died Monday morning, in the fortieth year of his age, the celebrated George Morland, whose uncommon genius as an artist did honour to his country, and will for ever place him in the first class of painters. As a faithful copier of nature it is allowed none could exceed him. The eccentricity of his character led him into constant difficulties; he was immoderately given to drinking, which ruined his constitution, and accelerated his death. His garret served him for all the purposes of life, and of this he has left a most admirable picture, which he painted a short time since for Mr. Graham, as a companion to Sir Joshua Reynolds's Kitchen, in Leicester Square, the house that once belonged to his father. His genuine pictures are in few hands, and his drawings are still more scarce. He is said to have been the next heir of Sir H. Morland, Bart., but never claimed the title."—*The Star*, Nov. 1st, 1804.

. . . .

Let me request Arnold's prices that I have mentioned may be kept secret.

Best and most respectful compliments to Mrs. Johns and to Mr. Williams, to whom I shall write in a few days.

I remain, dear sir, yours sincerely.

S. PROUT.

I forgot to say that if Mr. A—— paints a picture for you, he wishes a small sketch to be made to show him what subject and figures you would wish. He paints *sheep* well; in short, all *cattle figures.*

Mr. A. B. Johns.

London, June 3rd, 1805.

DEAR SIR,—By this day's post I have received your letter, with five pounds enclosed, which will not be quite sufficient to defray all the expenses. I am so very short of cash that I feel myself unable to spare it from my pocket.

Your letter greatly surprised me from the relation of the circumstances by Ball, which are so very *falsely represented.* As it might be of serious consequence if permitted to rest, I have immediately taken up my pen to explain, and hope you will hinder such reports from spreading.

Having been informed of the encouragement offered to young artists by the R. S., I wished to become a candidate, for which purpose I began a drawing of Berry Pomeroy Castle. Before I had proceeded far with it I was taken very ill, and confined to my rooms till three days before the performances were admitted. "I then went to Mr. Baynes" (this is an extract from the letter which I sent to the Society) "intentionally to request his assistance, being still very unwell, and having but little time before me, but with which I felt myself dissatisfied because I could not claim it *wholly* as my own, after which the greatest part of it was spunged out, and I proceeded to give it all the originality possible, and when delivered at the Society Rooms I was satisfied with my proceedings, not knowing that I had acted contrary to the rules by which performances are decided for or against," &c. These circumstances, &c., I stated also in person before the Committee, and which were confirmed by the evidence of Mr. Baynes. I confessed to them that I had not altogether acted as I could have wished, and that I had not a shadow of a thought to impose on this laudable institution; but a young man who had been disappointed (and believing him to be my friend I did not keep the circumstances from him) artfully designed to injure me by asserting a base falsehood, which caused the drawing to be noticed. The Committee informed me that they were satisfied with my evidence, and dismissed me, assuring me no further notice should be taken of it. I have not time to enumerate every particular circumstance; but it reached Ball from the third person, the first being him whom I mentioned before. I shall express my astonishment at his proceedings, and put a stop to such unfriendly conduct.

I feel myself much obliged by your kind expressions and wishes to stop the tongue of slander. I hope these *hasty lines* will prove the powerful weapon. As I told the Society I am bold to repeat, "that I start from such influences" (imposition) "with resolution to act upon *principle*, and I hope my character will always bear the strictest scrutiny."

I am surprised that from such trifling guilt any one would dare to condemn me, or at least to that degree which I fear from your report I suffer. You will act as my friend with these simple facts, and I shall take the earliest opportunity to stop Mr. Ball.

I write in *great haste;* you will therefore excuse the manner, &c.

Yours truly, S. Prout.

P.S.—You might contrive so to fold your letters that instead of being charged treble (for two bills in one letter) I should pay but double.

Mr. A. B. Johns, Pike Street, Plymouth, Devon.

Brixton, March 30th, 1815.

My dear Johns,—I am glad I have had the pleasure of hearing from you again, as I began to fear you had relinquished your proposition, or did not intend to favour me with allowing me to have a hand in the business. As you have not to please connoisseurs or critics, perhaps you have done well in deciding to secure yourself against loss; for I acknowledge, however desirable for reputation, it would have been almost an imprudent speculation where the numbers of subscribers must be so limited as in a country town. No degradation I hope to Plymouth.

When you have completed your picture forward it to Mr. Stadler, Villiers Street, Strand, and favour me with a letter that I may have a peep, &c.

I wish you would give me permission to do a little more in superintending the plate than your letter seemed to promise. I am sorry I said anything in my last letter about time; for since it has been deferred so long I can now undertake to do what will be necessary without trouble, having nearly completed all my drawings for the exhibitions. Rather than impressions should be sent backwards and forwards, till you have made it like the painting, let me first suggest what may be necessary to make it correct before it is sent to Plymouth, as it will save time.

I should very much like a palette in your workshop. Though a stone, your metal might strike fire. If two agree, three could splash away without daubing each other. I have sinned a sin in canvas for Somerset House, and not a little one either, by the breadth and length thereof, seven feet by five feet.

I think you should have exhibited this year. It is a good plan to keep the name regularly in the *Catalogue*. Ball is a long while priming and loading. Tis to be hoped he will make us all hop by his pop. I trust his name will be honourable. This devil out of the box will keep you from Paris; but I hope what is so soon up will be soon put down. But you can see paintings in London, and very good ones too. Come up and spend a few weeks in June. Thanks for all assurances of friendship. Mrs. Prout and myself wish to be always thus remembered by you. We unite in best respects to all. When the engraver has received your picture I will get every particular from him about the price, expenses, &c., but nothing decided can be said till he sees it.

My pen is always a runner, and I have given it an extra jink, being obliged to hurry into Town.

You must not forget my kind remembrance to Mrs. Johns and Ball.

Yours very faithfully,

SAMUEL PROUT.

A. B. Johns, Esq., Old Town Without, Plymouth.

Brixton Terrace, London, Nov. 18th, 1815.

MY DEAR SIR,—In spite of the success of friends, and satisfaction in hearing of their good luck, my strongest feeling on reading your kind letter was displeasure at the unhandsome manner in which I have been treated by the directors of the Plymouth Exhibition. They must have wished my name not to have appeared amongst the worthies of Plymouth. No doubt they have succeeded in their wishes, almost mean, certainly ungentlemanly. There was time to ask my consent; and as my reputation for a twelvemonth depended on it, it would have been but just. First impressions are lasting, so I shall not hope for what I should have been proud to have obtained at my first appearance, when I appear in paintings and in person next August; for I hope to see you next summer. I am glad Ball has made so good a beginning. I hope 'twill be a nail driven in a sure place. Give my kind regards and warmest congratulations; also to Eastlake, who will make his way most honourably. I am painting every day with hopes of standing with you at the Institution.

I could not understand what stopped our correspondence; but I shall be always ready to renew it, and most cheerfully render you any assistance.

I intended writing you a longer letter, which would have looked a little more friendly, but I must beg a truce till the next opportunity.

Whenever Mr. Carter sends a letter to Ackerman, a letter to me will be forwarded immediately.

I have troubled you with a letter for Brockedon, to be dropped into the post; also one for my Father, which I will thank you to have the goodness to deliver. Mrs. P—— unites in kind remembrances to Mrs. Johns with,

Dear sir, yours most truly,

SAMUEL PROUT.

To A. B. Johns, Esq.

4, Brixton Place, London, July 12th, 1821.

My dear Johns,—Although it gives me much pleasure to write you, yet I am almost sorry Rogers was so careless of the letters I sent by him, being obliged to prepare a great deal before I trip it.

Accept sincere thanks for your picture. It hangs before me at dinner, so that it has been well digested; and I have the pleasure of saying that I conceive it most excellent in what it has, though I am always looking for something it has not. The distance and middle distance particularly is, in my opinion, exactly what it should be in the degree of finishing; but what is the foreground? Certainly what we see most clearly, and therefore I think should be the most defined, and yet in your picture it only asserts in light and shade; and although I should not wish to be attracted by it, on looking into it I expect to see something on it. Excuse this freedom. It may not be correct of all your pictures; but certainly this one wants more foreground detail. The composition and arrangement are uncommonly good, and it has a pleasing harmony of colour, but I think a little too dark; and this is the impression of many who have seen it, as they immediately exclaim, "What a pretty picture; but is it not too dark, and too much like an old picture?" which is exactly what I mean. And though I cannot battle the subject with you, I must charge you with looking too much at the time-tinted masters.

If you paint in this manner you will not put a stop to the sale of old pictures, and very few collectors purchase both ancient and modern, and certainly always there is a bias which I pray may very soon be altogether for the living artists to keep us alive and employed.

This is saying the worst I can of you and your kind present, which I value very much for its merit and friendship. I knew you felt well, and could paint well; but I did not expect to see so good a picture. I must repeat that the trees and the bank with the cottage are excellent; but I will fight for the foreground, and by-the-by for Calcott too. Brockedon told me yesterday, although he admired your little picture exceedingly, he had seen better of yours at Plymouth. I am glad of it. I am writing hurry-scurry, not poetically, like my friend Johns; but I can add my sincere regards and best wishes, in which Mrs. Prout unites, to you and Mrs.

Johns. I will write you on my return from Germany. I have not seen Ball. Is he likely to be at Paris next month? If so, where is he to be found? Don't write on purpose, as I hope to be there next month. It would give me great pleasure to see him.

Yours sincerely,
SAMUEL PROUT.

To A. B. Johns, Esq., Old Town Without, Plymouth.

Brixton, Friday night.

DEAR SIR,—I cannot but still lament it is not in my power to tell you a little of my method of drawing, as it would have given me pleasure to communicate what I'm very sure would have been understood.

Your enquiry is natural; I have felt it, and do very particularly feel anxious to unravel good colouring whenever I see it; but perhaps nothing is more simple, when known, and nothing more difficult to explain, as it does not rest on the materials, but in the *feeling*, and probably in a certain aptitude—I mean, in combining the same tints, which are felt to be necessary, from different colours.

Resting on a *method*, or attempting to learn from *written instructions*, is, plainly, resting on a stick for support without making proper use of our legs. Excuse the familiarity; but generally they are incumbrances and hindrances.

Keep to a *few* colours; work with them only, till you have learnt something, and very soon your confidence and knowledge will increase. Avoid patches of colour. The same colour, in a degree, should tint every part of your drawing, which may be done by freely working one tint in with another; that is, to let them unite before they dry on your paper.

I may be condemned as somewhat careless in my method, but I'm very unfriendly to that littleness of care which some insist on.

Always mix up a good quantity of colour before you begin, and rather *float* in your general tints, than very deliberately put one colour on after another. I daresay these hints are unnecessary to you, but I've scribbled them down as they occur as general observations.

Reds—*Indian Red* and Lake.

Browns—Burnt Sienna, Vandyke-brown, and Burnt Umber.

Yellows—*Raw Sienna*, Roman and Yellow Ochre, *Dark Brown-pink*, and *Gamboge.*

Blue—Indigo.

Byrnes-brown, No. 1, is a useful colour for dark touches, it being clear and gummy. It may be had at Smith and Co.'s, Colourmen, Piccadilly, where I generally purchase my colours.

For waterfalls, keep to grey in your forms and light and shade, slightly tinting over it the reflected colours. For Grey, use Indian Red and Indigo. In old houses, &c., add Burnt Sienna to your Grey, Dark Brown-pink, Raw Sienna, &c., varying them according to your feeling and the knowledge of local tints. In my foregrounds and nearer parts of buildings I sometimes run into *dark grey*, yellows, and browns, so as to render the effect of *no colour*, and though it may sometimes appear dingy, touches of transparent colour, such as the raw Sienna, Byrnes Brown, &c., will clear out your effect.

Permit me to add the best method I know of acquiring colouring is, by using your colours in sketching from nature with freedom; copy what you see, not too minutely, nor slovenly; when your time will allow it, try this method, and do not attempt much *finishing* till you have washed in the general features and character of your subject.

I am almost ashamed to send you such a hasty letter. 'Tis very unconnected, and will, I fear, be but of little value. Time tyrannizes over me, or I would have endeavoured to arrange these thoughts in a more simple form.

I am obliged to you for having so politely mentioned me to Mr. Smith, at Dulwich.

I hope you will do me the favour not to think of anything like a remittance, as indeed this has not been any hindrance, nor has it cost me any trouble.

I shall rely on your having the goodness to excuse the running haste of my pen. Yours faithfully.

SAMUEL PROUT.

NATURAL HISTORY OF COAL.

ABSTRACT OF PAPER BY MR. F. J. WEBB.

(Read March 18th, 1880.)

After alluding to the importance of the enquiry, both from an economical and scientific point of view; also to the strange combination of paradoxical natural phenomena by which the apparently permanent and solid crust of the earth is the type of decomposition and change, while the ever-restless ocean is the true type of constancy and permanence, the subject was defined as "the consideration of those *external* conditions and influences by which it is surrounded, and by which it has been affected, together with the *internal* changes consequent upon these conditions and influences, and by which it has been brought into the state in which it is now presented to us."

Evidences, both external and internal, of the vegetable origin of coal were adduced; and it was shown that in a progressive series, as peats, lignites, jets, carbonaceous shales, bituminous and anthracite coals, it is a product of all geological epochs, whenever there was a soil capable of producing and sustaining vegetation—the paucity of the supply from the older formations being noticed, and the occurrence of graphite in its place. Peat beds were described, and their geological relation to lignites. The mutual relationship was shown between bituminous coal and anthracite, the former passing into the latter by chemical change. The geological connection between the two was described—the bituminous coal being the product of undisturbed districts hermetically closed by superincumbent, impervious clays; while anthracite was the product of conditions favourable to the loss of the volatile gases, thus leaving an excess of carbon. Instances from Pennsylvania, the Forest of Dean, and the South Wales district were cited. The inflammable nature of cannel coal was illustrated by lighting a specimen at the table-lamp.

The arguments of M. Fremy, and his chemical researches into the "formation of coal," as described by himself in a paper read before the Académie des Sciences, and published in *L'Houille*, were passed under review.

The geological relation of the Coal Measures was described. The several members of the Carboniferous System were alluded to, and the teachings of the members of the Coal Measures—shale, sandstone, limestone, ironstone, and fire-clay—detailed, especially with regard to the oscillation in the level of the sea bottom. The merits of the rival theories—"drift" and "*in situ*"—were discussed, the lecturer's conclusion being that the truth appeared not to have rested wholly with one side or the other, the advocates of either alike taking too narrow a view of the whole of the conditions; in fact, each side had a measure of truth attaching to it.

The help afforded to the controversy by the discovery of erect trunks was noticed, and instances quoted where such had been found in England, and upon the Continents of Europe and America. The "Great Dismal Swamp" of Virginia was cited as illustrating the "*in situ*" theory, and the comparative purity of coal beds by the existing conditions of the "cypress swamps" and "sunk country" of the Mississippi. The conditions necessary to the production of a repetition of coal beds in the same vertical space were discussed, and the comparatively modern succession of forest beds adduced, ten in number, which skirt the mouth of the Mississippi for about two hundred miles, belonging to the "Delta" period of the Quaternary epoch.

The impossibility was shown of representing geological time chronologically, except by very inadequate estimates, so as to arrive at a conclusion as to the length of time necessary for the deposition of the Coal Measures; but all the conditions pointed to immensity in point of time rather than brevity, as argued by those writers of whom Dr. Radcliffe, in the *Contemporary Review* of February, 1880, may be taken as a type.

The occurrence of the Coal Measures in basin-shaped troughs, and their connection with the work of denudation, was described, together with the original continuity of coal-fields; *e.g.* South Wales, Forest of Dean, and South Gloucestershire; the Northumberland and Durham, with Cumberland; and the latter with the Kirkcudbright; also the Lancashire and North Wales. It was also suggested, from the nature of the dip of the strata of

South Wales to the south, and the Carboniferous strata of Devon towards the north, that it was probable the latter was at one time joined to the former, the Bristol Channel occupying the synclinal trough. The separation of all or most of these coalfields must have occurred prior to the deposition of the newer strata, which, from the deep borings through the Wealden and Chalk, are found to rest unconformably upon strata older than the Carboniferous; so that if the latter had existed, they must have been denuded prior to the deposition of these newer strata.

THE STONE IMPLEMENTS.

ABSTRACT OF LECTURE BY MR. F. BRENT.

(Read March 25th, 1880.)

The Lecturer, after pointing out that the study of the stone implements in relation to pre-historic races of man had received very little attention until within the last half century, gave some recorded instances of the discovery of polished celts in Cornwall, &c., in the eighteenth century, and of Palæolithic implements in the gravels of London as early as 1713. It was not, however, until the discoveries of M. Boucher de Perthes at Abbeville, and of Dr. Rigollet at Amiens, of worked flints in Drift enclosing the remains of extinct animals, had been made known, that any systematic classification or arrangement of stone implements had been made; but from that time there had been most rapid progress, and through the researches of Dr. John Evans, Sir John Lubbock, and other archæologists in this country, as well as abroad, the whole subject of the weapons and implements of the people of the Stone Age had been so thoroughly investigated as to leave no doubt upon the minds of the unbiassed that man must not only have existed prior to the deposition of the Quaternary gravels, but must have seen the mammoth and rhinoceros when they roamed at will in the South of England; the cave lion and the cave bear, when they dwelt in the caverns of Devonshire; and the reindeer in the Dordogne, when an arctic climate prevailed in the South of France. To refute the views, however, of those who still hold that the Drift implements and the sub-surface flakes do not owe their forms to man's agency, but are the production of nature alone, the lecturer went at some length into the manufacture of flint implements, pointing out that flint in its natural position in the Chalk or Greensand never presented the appearance of implements claimed as artificial; and that even in the Drift the implements presented such closely allied types, and varied so little in general character, but differed so much from the angular pieces forming the bulk of the redeposited gravels, that they could be readily distinguished even by the uninitiated. Great stress was laid upon the "bulb of percussion," which the lecturer maintained was the result of an adjusted blow; not necessarily the act of man, but when present on one side of a flake, and the other facets indicated that similar flakes had been struck off, then certainly the result of design, and consequently of man's hand. If so, then the "cores," so called, which exhibited signs of several flakes having been removed, were equally the work of human agency, and consequently the Palæolithic implements, which to all intents and purposes were cores, although intended and fashioned to be utilized as weapons, &c., which showed that many flakes or pieces had been removed, were also man's works. Passing over the geological question, the lecturer briefly described the different implements both of the Palæolithic and Neolithic periods, and drew attention to the vast quantities of articles of stone that had now been collected together in the museums both in Great Britain and abroad. The implements from the caves of the South of France, Belgium, and Switzerland were referred to, and also the beautiful neolithic daggers and half-moon saws from the peat bogs of Denmark and Jutland, the lecturer pointing out the wonderful skill that had been exercised in their manufacture, and the accuracy with which they had been fashioned, as if the material had been rather ivory or bone, than the intractable and brittle flint. The stone clubs, hoes, and axes of modern savages, now becoming so scarce that they were treasured up as relics even by the savages themselves, were mentioned as being of the highest value, especially those that were hafted, as they exemplified the manner in which pre-historic man might have utilized the weapons he manufactured; and attention was especially drawn to a tomahawk, or osquesont, used by the Iroquois, armed with a rude piece of obsidian. This latter, if found by itself, would have been passed by without notice; but hafted as it was in a wooden handle, the two formed a most formidable and death-dealing weapon. It was mentioned that savage man, whilst in his stone age, and unacquainted with the use of metals, made little progress; but that with the discovery of copper, and probably also the art of hardening it so as to form articles that could be used, his advance commenced to go on rapidly, through the bronze to the age of iron, and thus to the present times of the highest civilization and refinement. The manner in which the holes were bored in stone implements was described, and mention was made that a professor at Zurich had shown how the holes in axe-hammers, and similar articles, which have perpendicular sides, and which could not have been bored by the ordinary method, could be pierced by means of a piece of soft cow-horn, armed with *dry* sand, which was made to rotate by means of a simple bow and string, cutting out well-defined cores of a cylindrical form, many similar to which had been found in the Swiss lakes.

There was exhibited a diagram of a tribulum or threshing-floor, lately brought from Cyprus, where it is the ordinary implement of farm use, and cost only 15s. at Larnaca. This was armed with 270 flint flakes, identical in form and manufacture with those that occur in such numbers in the eastern counties of England; and would seem to show that if somewhat similar implements were in use, as has been affirmed, by the early Romans in Britain, these flakes may date back no further than about two thousand years.

After giving some instances of folk lore, and remarking upon the superstitions that had been attached to arrow heads of stone in this country as well as abroad, the lecturer spoke briefly of the Devonshire and Cornish implements, his concluding remarks being as follows:

I can only now refer very casually to the implements found in Devon and Cornwall. These, as regards the Palæolithic, have only been met with in the gravel beds at Broom, near Axminster, at Colyton, and in Kent's Cave and Brixham Cavern. Polished, or ground, implements have been found in many situations, but their number is few; whilst the smaller flakes, scrapers, &c., can be gathered from many of the headlands of the two counties, not only along the coast, but on Dartmoor and the Lizard district, wherever old settlements can be traced, and frequently in very considerable quantities. The implements from Broom consist for the most part of chert; a few only have been found composed of flint. They are of a dark red colour, and amongst them are all the different types of palæolithic implements from other localities. Many of them are of a large size, and finished with much care; others are ruder. The gravel deposit consists of an enormous mound, or heap, which has long been quarried for material for ballasting the line belonging to the South-Western Railway Company, and good implements have been picked up along the line for some miles. There is a band of sand mixed with gravel that runs in a horizontal direction near the base of this mound, and it is from this band that the implements have been for the most part obtained.

Through the kindness of Mr. d'Urban, of the Albert Memorial Museum, at Exeter, I am enabled to place upon the table for your inspection a few of these specimens, which, if perhaps not so good as many which have been obtained, at all events are nearly representative of the deposit, a few forms only being absent; amongst these I may mention the lance shaped, and those that have an edge curved like a scimitar; these last are very rare. In the Exeter Museum are at least fifty specimens; these, however, do not nearly comprise the whole that have been found, but they exhibit all the forms. Very few true flakes have been met with, and if cores are contained in the deposit they do not appear to have been obtained.

Polished implements have been found at Trevalga, Falmouth, Truro, and Pelynt; saddle querns and grinding-stones in other parts of Cornwall. In the Exeter Museum there is a large stone hammer found at Honiton, and there is another similar hammer in the possession of Mr. Spence Bate, that was procured near Tavistock. In our own museum are two beautiful polished celts found in peat near the head of the Walkham, on Dartmoor; and also two chipped spear heads, said to have been found at Hemerdon, but believed to be from North America. Almost all the forms of chipped arrow heads that have been found in Great Britain appear to have their representatives in the two counties. They have been obtained from under peat at Dartmoor by Mr. Spence Bate, and some in my own collection are from barrows near the Cheesewring and from the neighbourhood of Dozmare Pool; several of these are barbed, others are of a beautiful leaf-shaped form, whilst one, made from a flake, is nearly triangular, one side having a fine edge; the other only has been chipped.

Arrow heads and flakes are frequently associated with ancient interments, and have been found by Mr. Borlase placed within urns with burnt bones in many of the barrows he has opened. Mr. Spence Bate obtained from a barrow on Hamildown a black flint instrument, which was accompanied by a beautiful amber dagger pommel and remains of a bronze dagger. Mr. S. Bate is of opinion that the flint was formerly mounted as a club or axe. I scarcely, however, think he is right; but rather hold that it was used only as a scraper, and held in the hand. I have two, out of about a hundred, arrow heads that were contained in an urn taken from a barrow near Caradon. I have also a fine scraper from Three Barrow Tor, and some others from within the circle at the top of White Tor.

There is also a beautiful little chipped implement found by myself on the Moor below Yes Tor. This is supposed to have been used for the purpose of preparing arrow heads, and is termed a fabricator. The specimen is one of the most perfect that has been met with; both ends present signs of use, the angles of the facets being ground nearly smooth, as if from friction upon some other object. Whatever may have been the use of this implement, I am of opinion that the one ascribed is not the correct one. I do not think the polish has been given by contact with stone, but rather with less hard substances, such as bone or wood, perhaps even skins.

The smaller implements, such as flakes, scrapers, borers, and cores, occur in many places in the two counties. I have found them on Staddon and Maker Heights, near Tavistock, and on White Tor; also at Dozmare Pool, Kynance, and the Land's End; and from the fact that they are usually accompanied by fragments, chips, and broken pieces, I am of opinion that they were manufactured on the spot from pebbles brought from a distance, and were not themselves usually made articles of barter in their perfect condition. Mr. W. C. Borlase, of Penzance, informed me that on Goonhilly Down, in the Lizard district, he procured a thousand flakes, &c., in a very short time. Mr. Spence Bate dug out a great quantity near Croyde, in Morte Bay; and I have picked up on the borders of Dozmare Pool, Cornwall, more than nine dozen in the course of a few hours. However, it must not be supposed that many of these are perfect; on the contrary, for the most part they are merely fragments, and the percentage of even nearly perfect flakes is very small indeed; such, at least, is the case with those I procured myself. This broken state may be accounted for in many ways. In the first place, with such a brittle material as flint, and with a primitive mode of operating, many doubtless were broken during the process of manufacture, and were at once thrown away; others were used up, and broken even after they were perfectly turned out; and again, during the old tinder-box days, before the introduction of lucifer matches, the larger pieces were used as "strike-a-light" stones, or were converted into rude gun flints by the peasants. With all these causes of destruction, it is not surprising that so large a number are broken; but it is to be wondered at that so many are to be found in a semi-perfect or perfect condition. The material itself is almost indestructible, and we can form no idea as to the commencement of the period when these little articles were first used; and scarcely any of the time when their use was discontinued, varying so much, as this must have done, according to the degree of civilization to which nations had advanced, or to the discovery and adaptation of metals to the uses to which stone had hitherto been applied.

A CATALOGUE OF THE

PYRALIDINA OF PLYMOUTH AND ITS VICINITY.

ARRANGED ACCORDING TO STAINTON'S MANUAL.

BY MR. G. C. BIGNELL, M.E.S.

Order: *Lepidoptera*—Lin. Section: *Heterocera*—Bdv.
Group: *Pyralidina*—Stai.

HYPENA *proboscidalis*. Common. July. Everywhere.

rostralis. Rare. July and September.

crassalis. Not common. June and July. Plymbridge, Bickleigh Vale, among *Vaccinium myrtillus* (*whortleberry*). I have bred the imago from larvæ found feeding on it; it is said to feed on heath.

HYPENODES *albistrigalis*. Rare. June, July.

costæstrigalis. Common. 26th June, 1878, near Cann Barn, among *Erica cinerea* (Heath).

HERMINIA *tarsipennalis*. Not common. June, July. Plymbridge, Bickleigh Vale.

nemoralis (*grisealis*). Not common. June, July. Near Shaugh Bridge. Larvæ found feeding on *Corylus avellana* (Hazel).

PYRALIS *farinalis*. Very common. June to September. Everywhere. (Larvæ feeding on corn, bran, &c.)

AGLOSSA *pinguinalis*. Very common. June, July. Everywhere. (In stables, &c.)

CLEDEOBIA *angustalis*. Common. June, July. Bovisand, Cawsand, Rame Head.

PYRAUSTA *purpuralis*. Common. May to August. Cann Wood, Bickleigh Vale, Shaugh Bridge.

ostrinalis. Not common. At the same time and places as the preceding.

HERBULA *cespitalis.* Very common. May, July, and August. Slopes towards the sea; Whitsand Bay, and near Wembury Church.

ENNYCHIA *cingulalis.* Very common. Same time and places as the preceding.

ENDOTRICHA *flammealis.* Common. July (1870). Among *Pteris aquilina* (Brake fern), near Picklecombe Fort, towards Kingsand.

DIASEMIA *literalis.* Rare. Beginning of June and August. Between Bickleigh Station and Shaugh Bridge, Lee Moor Tramway, near Cann Barn.

STENIA *punctalis.* Not common. August. Bovisand, Cawsand, near Rame Head.

CATACLYSTA *lemnata.* I have not taken it in the Plymouth district, but abundantly at Exminster.

HYDROCAMPA *nymphœata.* Common. June, July. Bickleigh Vale, opposite Cann Quarry.

BOTYS *hyalinalis.* Rare. July. Bickleigh Vale.

verticalis. Common. June, July. Everywhere.

lancealis. Common. June. Cann Wood, Bickleigh Vale. (Larva on *Eupatorium cannabinum*—Hemp agrimony—August, full fed in September, when it hybernates, and only changes into pupa a short time before the imago appears.)

fuscalis. Common. (1865.) June. Meadow, east end of the vale, Ivybridge.

asinalis. Rare. July. (1878.) Stoke, near Wingfield Villa.

urticata. Common. June, July. Ford.

EBULEA *crocealis.* Common. June, July. I bred the imago (30th June) from larva found feeding on *Digitalis purpurea* (Foxglove) at Laira.

sambucalis. Common. June, July, August. Vegetable gardens; bred from larvæ found feeding on *Cochlearia armoracia* (Horse-radish).

PIONEA *forficalis.* Common. May to August. Vegetable gardens.

SCOPULA *olivalis.* Common. June, July. Lanes everywhere.

prunalis. Common. Same as preceding.

ferrugalis. Common. August, October. I have found the larvæ in September feeding on *Senecio jacobœa* (common Ragwort), Oreston Quarries.

STENOPTERYX *hybridalis.* Common everywhere. June to September. In fields.

SIMAETHIS *fabriciana.* Common everywhere. June to September.

pariana. Common. July, September. Near woods.

EUDOREA (SCOPARIA) *ambigualis.* Common everywhere. June, July. Near woods.

basistrigalis. Not so common as the preceding. June, July. Near woods.

cembræ. Rare. July, August. Radford.

pyralella (*dubitalis*). Not common. May and June. Taken off beech trees.

ingratella. Scarce. June. Near Shaugh.

lineola. Not common. August. Bovisand, and once in Devonport Park.

frequentalla (*mercurella*). Common. June, July. Cann Wood, on oak trees.

cratægella. Not common. July, August. Near Plymbridge.

resinea. Common, but local. July, August. Laira, on apple trees.

truncicolella. Scarce and local. July, August. Cann Wood, Bickleigh.

angustea (*coarctalis*). Not common. April, August, September. Bovisand, Radford.

APHOMIA (MELIA) *colonella* (*sociella*). Not common. July, August. Compton, Bickleigh, Bovisand.

EPHESTIA *elutella.* Rare. June. Bred from larvæ found feeding in a tin of chocolate (purchased in the town).

HOMŒOSOMA *sinuella.* Abundant. July. (1867). On the slopes towards the sea, near the Citadel.

ACROBASIS (RHODOPHÆA) *consociella.* Common, but local. July, August. Kingsand, Rame Head.

tumidella. Not common. July, August. Kingsand, Radford.

NEPHOPTERYX (PHYCIS) *abietella.* Rare. June. Cann Wood.

roborella. Not common. Cann Wood, Bickleigh Vale, Shaugh Bridge.

PEMPELIA (ILITHYIA) *carnella.* July. Once at Exmouth.

PEMPELIA *palumbella.* Rare. July. A single specimen without locality.

CRAMBUS (PLATYTES) *cerussellus.* Not common. June. Quarry, Mount Batten.

CRAMBUS *falsellus.* Not common. July, August. Ivybridge.
pratellus. Common. May, June, July. Plymbridge.
pascuellus. Abundant everywhere. June, July. In fields.
hortuellus. Abundant everywhere. June, July. In fields.
culmellus. Abundant. June, July. Roborough Down.
inquinatellus. Abundant. August. Near Plymbridge.
geniculellus. Common. July and August. Near Plymbridge.
contaminellus. Rare. June, July. Railway bank, near Plymbridge. (23rd June.)
tristellus. Very common. July, August, September. Everywhere.
pinetellus. Not common. July, August. Cann Wood, Bickleigh.
perlellus. Common. July, August. Meadows, Plymbridge, Compton.
CHLOEPHORA (HALIAS) *prasinana.* Common. May. Bickleigh, Shaugh, and Cann Woods.

The number of Pyralidina enumerated in Stainton's "Manual" is 160; there are in the foregoing list 60; the whole of which I have taken, and hope at some future time to add to this number. I believe this is the first record of these small moths captured in this neighbourhood.

STONEHOUSE, *February 25th,* 1879.

APPENDIX

TO

THE THREE TOWNS BIBLIOTHECA.

BY R. N. WORTH, F.G.S.

To compiling a Bibliotheca there is certainly no end. Eight years ago, in 1872, there appeared in the *Transactions of the Plymouth Institution*, under the title of the "Three Towns Bibliotheca," a list of works and papers in various ways connected with Plymouth and its sister towns, the result of several years' continuous research. That list contained the heads of about 1900 articles by some 700 authors, and appeared at the time to be as complete as circumstances admitted. In the following year I was enabled to add a supplement, partially as the result of the interest awakened in the subject by the appearance of my catalogue. Since then, thanks in no small degree to the growing claims upon public attention of all matters connected with Bibliography, I have been able so largely to add to the list, that, with the local productions dating between 1873 and 1880, the appendix now presented contains the record of upwards of 800 books and papers, all of local interest and connection, by over 300 authors, many of whom are now recorded for the first time. There must still remain many omissions; but I do not think that, as a rule, they can be of any great importance. The Bibliotheca with its supplement and appendix in all probability presents therefore a fair and, with a few exceptions, a full statement of the literary work of the Three Towns for the three centuries over which its recorded history ranges, from the *Treatise on Education*, published by William Kempe, schoolmaster here in the eventful year of the Armada, down to the date of the present volume of our *Transactions*. It is certain, moreover, that for a very large proportion of the entries there will ere long exist no other authority. Indeed, the only record that now exists of many of the more ephemeral works cited is contained within these pages.

I have to acknowledge kind assistance from many friends, and particularly from Messrs. George Clement Boase and William Prideaux Courtney, the editors of the most perfect of bibliographical records—*The Bibliotheca Cornubiensis;* the Rev. J. Ingle Dredge, vicar of Buckland Brewer, whose acquaintance with Puritan literature is extensive and profound; and Mr. W. H. K. Wright, Librarian of the Plymouth Free Library.

It would have been easy to expand this Bibliotheca to very much larger dimensions by the inclusion of formal official documents, &c., and the record in all cases of full titles. Of this, however, space did not permit; there are cases in which, fully recorded, a single title would occupy a page.

In the list of authors, particulars already given in the Bibliotheca and supplement are not repeated in the Appendix; but advantage has been taken of the opportunity afforded to make a few corrections.

The arrangement under subjects was adopted to facilitate the use of the Bibliotheca as a work of reference, for the purpose of ascercertaining what has been already recorded upon different topics, and I am glad to know that it has fully answered the purpose. With the aid of the Index the works of different authors can with little difficulty be classed together.

ART.

Altar-piece of St. Andrew's Chapel. J. Erskine Risk. Dev. Ass. Trans. ix. p. 164.

Arise ye Sons of England [patriotic song]. Words by W. H. K. Wright; music by Mrs. Jacobson.

Bates (Sir E., M.P.), portrait of. F. R. Dunstan, Plymouth. 1875.

Berceause [cradle song]. For the pianoforte. A. C. Faull.

Bird of my Breast, away. Words by Rev. H. Lyte; music by Mrs. Jacobson.

Bright Days will come again. Words by Major Ward; music by Mrs. Jacobson.

Dear is the Morning Gale of Spring. Music by J. F. D. Yonge. Lidstone, Plymouth. 1854.

Denis, Dear [ballad]. Words and music by T. J. Prout. Weekes, London.

Dreams. Composed and affectionately inscribed to Lady Snow Harris by Mrs. Jacobson. Weekes, London.

Early Christian Art. J. E. Risk. Dev. Ass. Trans. vi. p. 481.

Early Closing [song]. Words by Frederick Thomas; music by W. Hallet.

Festal March, composed expressly for the opening of the New Guildhall, dedicated to the Prince of Wales. F. N. Lohr. Moons, Plymouth. 1874.

First Book on the Theory of Music. Louisa Gibson. Sellick, Plymouth. 1875.

Garland of Wild Flowers [valse]. Dedicated to W. F. Moore, Esq., Right Worshipful the Mayor of Plymouth, in the third year of his mayoralty. H. Whitfield. Sawday, Plymouth.

Guildhall (New), Plymouth [lithograph]. C. R. Baggs, Plymouth. 1874.

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Helston Polka and Ruby Mine Waltz. E. C. Shaw. P. E. Rowe. Plymouth.

Hints on Light and Shade and Composition. S. Prout.

Honour (The) of our Land [song]. T. J. Prout. 1876.

In every Soul let Feeling dwell [song]. E. Hanson. 1874.

In Dreams thy Form comes back to Me. Words by Amelie; music by H. P. Sawday. Sawday, Plymouth.

Lord (The) is my Shepherd. F. N. Lohr. 1874.

Mother's (A) Dream. Words and music by T. J. Prout.

O God, my Heart is ready [sacred cantata]. J. Hele, Plymouth. 1873.

Photographic and Parliamentary Album of Devon and Cornwall. Duprez, Plymouth. 1869.

Plea for the Picturesque in Devonshire Towns. J. Hine. Dev. Ass. Trans. ix. p. 156.

Portraits of the Spruggins Family, arranged by Richard Sucklethumbkin Spruggins, Esq. [*i.e.* Countess of Morley]. Privately printed. Plymouth. 1829.

Restless [song]. Kate Hearder. 1873.

Sacred Cantata (A) from the 103rd Psalm. S. Weekes. Weekes, London. 1874.

Sketches in Flanders and Germany. S. Prout. 1836.

Sketches in France, Switzerland, and Italy. S. Prout. 1839.

Snowdrop, sweet simple Flower [ballad]. Words and music by T. J. Prout.

South-western Polka (The). G. T. Derry. Holt, Devonport. 1876.

Studies of Cottages and Rural Scenery. S. Prout.

Suffer Little Children to come unto Me. Chorus for the united choirs of Plymouth Sunday-schools. Dedicated to Mr. J. E. E. Dawe. A. C. Faull. Weekes, London.

Sway thy Sceptre. [New national air.] G. H. Marles, Devonport.

Sweet Chimes the Bell [song]. Words by G. P. R. James; music by Mrs. Jacobson.

Tears [song]. Words by Lord Byron; music by Mrs. Jacobson.

There is a Green Hill far away [chorus]. A. C. Faull. Moons, Plymouth. 1875.

Three original songs, composed expressly for J. F. D. Yonge. P. E. Rowe, Plymouth.

True [song]. Kate Hearder. 1873.

Victoria Cross March. A. J. Elliott, Plymouth. 1874.

Waterfall Polka. W. K. Horne. Holt, Devonport. 1876.

When Spring Returns [song]. Words and music by T. J. Prout.

Write to the Young and Fair [song]. W. S. Yeo, Plymouth. 1874.

BIOGRAPHY AND HISTORY.

A Dvtifvl Invective, Against the moste haynous Treasons of Ballard and Babington: with other their Adherents, latelie executed. Together with the horrible attempts and actions of the Q. of Scottes: and the Sentence pronounced against her at Fodderingay. Newlie compiled and set foorth, in English verse: For a Newyeares gifte to loyall English subjects, by W. Kempe. Imprinted at London by Richard Jones, dwelling at the signe of the Rose and crowne, neere Holborne bridge. 1587. 4to. Four leaves.

Annals of the Militia, comprising records of the South Devon Regiment. Brendons, Plymouth. 1875. [Partly written by Col. Fisk, Capt. de Schmid, Quartermaster Jarvis, and Major Seale Hayne.]

Ashburton Scholars (Two). J. M. Hawker. Dev. Ass. Trans. viii. p. 526.

Ashburton (Ancient Stannary of). R. N. Worth. Dev. Ass. Trans. viii. p. 311.

Bishopsteignton (Sketch of). J. M. Hawker. Dev. Ass. Trans. vi. p. 412.

Charge (A) of high treason prepared by the London apprentices against Col. Howson, and the strange apparitions that appeared unto him, immediately after being taken near Plymouth in Cornwal, with his speech and confession to the vision. 1660.

Cistercian Houses of Devon. J. Brooking Rowe.

I. Buckland. Dev. Ass. Trans. vii. p. 329.
II. Buckland. *Ibid.* viii. p. 797.
III. Buckfast. *Ibid.* viii. p. 809.
IV. V. Newenham and Dunkeswell. *Ibid.* ix. p. 361.
VI. Ford. *Ibid.* x. p. 349.

(Also published in one volume.)

Cookworthy, William (Second Appendix to Memoir of). By his grandson. 1872.

Coverdale (Myles). J. M. Hawker. Dev. Ass. Trans. x. p. 209.

Declaration (A) made at Bodmin, November 21st, 1643, by the high sheriff, justices, the king's commissioners, gentlemen, grand jury, constables, and freeholders, to raise men, money, and arms "to suppresse all rebells, and especially now these of the town of Plimouth."

"Declaration (A) of the Cornish-men concerning the Prince of Wales and the resolution of the two famous garrisons of Plymouth and Portsmouth." February. 1645 (?)

Declaration of Lord Hopton "to all his majestie's loving subjects inhabiting the severall counties of Cornwall, Devonshire, &c." Dated Plymouth, May 20th, 1643 (?)

Eἰκον βασιλικον. Several evidences which have not appeared in the controversy concerning the author of Eikon Basilikon. By John Yonge, of Plymouth. 1703.

Happy Valley (The). W. Wakefield. Brendons, Plymouth. 1879.

Hawker, R. S., Vicar of Morwenstow (Life of). S. Baring-Gould. 1876.

———————— Dr. Lee. 1876.

Haydon, B. R. (Life of). By his son, F. S. Haydon. 1875.

Hearder (Jonathan), PH.D., F.C.S. R. Oxland. Plym. Inst. Trans. vi. p. 150.

Historical Sketch of the Tin Trade in Cornwall from the Earliest Period to the Present Day. W. C. Borlase. Brendons, Plymouth. 1874.

Historical Windows (The) in the New Guildhall. J. Smith, Plymouth. 1876.

History (A) of the Fête at Mount Edgcumbe, written before it took place, by one who didn't mean to be there. R. W. Stevens, Plymouth. 1848.

History of Nonconformity in Plymouth. R. N. Worth. [Reprinted.] Plym. Inst. Trans. vi. p. 44.

Jackson (Recollections of Thomas). S. Dunn. Trythall, Plymouth.

John Ford. R. Dymond and J. M. Hawker. Dev. Ass. Trans. vii. pp. 420.

Journal of the Lives and Labours of W. Caton, J. Burnyeat, and John Croker, of Plymouth. 1839.

Kitto (Life of Dr.). J. Eadie.

——— (Memorials of). J. Ryland.

Lecture on the History of the Jews. S. P. Tregelles. W. Brendon, Plymouth. 1855.

Letter (A) to the Right Hon. Lord Clinton, with a brief narrative of the persecutions and sufferings of Joseph Whitley, late of the New Inn and Tavern, at Callington; also of the abuse of the license of the said inn. To which is annexed a letter to John Tillie Coryton, Esq. Williams, Plymouth. 1822.

Madge (Memoir of the Rev. J.) [b. Plymouth.] W. James. 1871.

Manly Peeke, of Tavistock. J. Brooking Rowe. Dev. Ass. Trans. xi. p. 262. [Reprinted with fac-simile title.] 1879.

Mason (Select Remains of the Rev. J.) Compiled by S. Nicholson, Plymouth. Devonport. 1836.

Miscellanies in Prose and Verse. Mrs. Catherine Jemmat. 1766.

Narrative of the Loss of the sloop *Nautilus*, wrecked January, 1807, "by the late John Boone, purser, in His Majesty's Service, one of the survivors." Hoxland and Colman, Devonport. 1827.

Notes on the History of Printing in Devon. R. N. Worth. Dev. Ass. Trans. xi. p. 497. 1879.

Notes on the Historical Connections of Devonshire Place Names. R. N. Worth. Dev. Ass. Trans. x. p. 276.

Our Life and Travels in India. W. Wakefield. Brendons, Plymouth. 1878.

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Plimouth Memoirs. Collected by James Yonge. 1684. Edited and annotated by R. N. Worth. [Reprinted.] Plym. Inst. Trans. v. p. 509.

Plymouth (Collections towards a History of). C. Redding, MS. *c.* 1810. Prospectus issued by Haydon, but nothing more done.

Praed (Winthrop Mackworth). J. M. Hawker. Dev. Ass. Trans. vi. p. 728.

Prideaux (John), Bishop of Worcester. J. M. Hawker. Dev. Ass. Trans. ix. p. 184.

Prince (John). E. Windeatt. Plym. Inst. Trans. vi. p. 340.

Prout (Life of Samuel) J. Hine. Plym. Inst. Trans. vii. p. 261.

Puritanism in Devon and the Exeter Assembly. R. N. Worth. Dev. Ass. Trans. xi. p. 250.

Raleigh (Sir Walter). R. Collier. Plym. Inst. Trans. vi. p. 133.

Records of the Services of the Sergeants 42nd Royal Highland Regiment, "The Black Watch," from the time of the formation of the Sergeants' Mess, 24th August, 1826. Pyke, Devonport. 1873.

Recollections and Remains of late Rev. G. D. Doudney. Edited by his brother-in-law. London. 1866.

Reminiscences of Past Experience. By late Mrs. G. Soper, of Plymouth. London. 1839.

Risdon (Sketch of). J. M. Hawker. Dev. Ass. Trans. vii. p. 79.

Roman Devon. J. Brooking Rowe. Plym. Inst. Trans. vii. p. 235.

Service (A) of Suffering; or, Leaves from the Biography of Mrs. Croad [a native of Plymouth]. J. G. Westlake. 1880.

Sepoy Revolt (The). H. Mead, Editor *Delhi Gazette.* 1857.

Short Account (A) of a Beloved Sister. Lucy Worth. Brendons, Plymouth. 1878.

[For private circulation only.]

Siege (The) of Plymouth. R. N. Worth. Trans. Plym. Inst. v. p. 250.

Some Account of Lord Boringdon's Accident, 21st July, 1817, and its Consequences, with portrait and view of the monument. 1818.

[Privately printed, priced 10s. 6d., in Hindley's Catalogue, 1878, the copy being one presented by Lord Morley to Visct. Villiers, with inscription.]

Statement of Services. J. Edye. 1863.

Summary of Mosheim's Ecclesiastical History. C. T. Collins [Trelawny], London. 1822.

Tables of History, chronologically arranged by P. Roberts, classical teacher, Saltash. Williams, Devonport.

Three Days French Revolution. Percy B. St. John.

Transcript (A) of the Parish Expenditure of Milton Abbot for the year 1588. Plymouth. 1808.

Travels in the Wilderness to his Heavenly Home: a Memoir of J. F. Rudman, late Pastor of Church of Christ at Trinity Chapel, Plymouth. By W. Hawkins. London. 1854.

Trip Home (A) with Homespun Yarns. 1842. [Letters descriptive of Plymouth and Devon.]

True Relation (A) of the Present Estate of Cornwall, with the true proceedings of Captain Pym, who is with his forces at Plimouth hindering the passage of the Lord Mohone, which, with seventeen thousand cavaliers, endeavoureth to joyne his forces with his Majesty. Ieremiah Trivery. Dec., 1642.

Thorne, Samuel, printer. Memorials. By S. L. Thorne, Bodmin. Friend, Plymouth. 1874.

Tregelles (Memorial Notes of) Dr. S. P. [Reprinted from *Western Daily Mercury*, 1875.]

By Professor Abbot, D.D., LL.D., extracted from *Independent* (American). Latimer, Plymouth. 1875.

——————— J. Brooking Rowe. Plym. Inst. Trans. v. p. 356.

Tywardreath (History of). J. Bartlett. Lidstone, Plymouth. 1862.

Visit to Bonaparte in Plymouth Sound. E. M. Potts. Dock. 1815.

Wolcot (Peter Pindar). J. M. Hawker. Dev. Ass. Trans. ix. p. 331.

Yonge (A Memorial of the Rev. Duke) [d. 1823]. [Reprinted 185–.] Privately printed, Plymouth. 184 -.

MANUFACTURE, TRADE, AND COMMERCE.

Account of Certain Plans and Suggestions for the Improvement of the Rudder. Rear-Admiral Brooking, Plymouth. 1826.

Address to the People of England; containing an enquiry into the cause of the great scarcity of timber throughout the dominions belonging to his Majesty. [Yeoman Lott.] 1766.

Albert Bridge (History of the). W. Wood, Devonport. 1859.

Book (The) of the Feet: A History of Boots and Shoes. J. Sparkes Hall. [Passed through several editions.]

Breakwater (Minute on) Plymouth. Bentham. 1811.

Papers Relating to Plymouth Sound. 1812.

Views and Sections of Breakwater.

Building and Ornamental Stones of Cornwall. R. N. Worth. *Journal R. I. C.*, Sept., 1875, p. 215.

Cookworthy, William, and the Plymouth China Factory. R. N. Worth. Dev. Ass. Trans. viii. p. 480.

Devon and Cornwall Railway; report of the committee on the construction of, through Cornwall. 1840.

Description of a New Harrow and Drag. R. Treffry. Papers Bath and W. E. Soc. iv. pp. 330–33. 1787.

Dissertation of the Diving Vessel projected by Mr. Day and sunk in Plymouth Sound. N. D. Falck, London. 1775.

Directory of Three Towns. Trythall, Plymouth. 1878.

Directory of Three Towns. Hainsworth. 1875.

Directory (A) of Plympton St. Mary. By the Clergy. Birmingham, Plymouth. 1875.

Directory of Devon. White. 1878.

Directory of Devon. Harrod. 1878.

Extension of Wharfage, Millbay, Plymouth. C. McGuire Bate. *Royal Engineers' Journal.* 1880.

Gutch's Railway Time Tables. Plymouth. 1876. [Few months only.]

Important Hints towards the Improvement of the Royal Dockyards, by a Man of Kent. [Yeoman Lott.] 1767.

Interest Time Tables. W. Lewis. Brendons, Plymouth. 1874.

Naval Gunner (The). T. S. Beauchant. Devonport. 1828.

Naval Architecture. Isaac Blackburn. Plymouth. 1836.

Official Great Western Railway Guide to Plymouth Meeting British Association. Brendons, Plymouth. 1877.

Plymouth Sound. J. C. Inglis. Plym. Inst. Trans. vi. p. 275.

Plymouth and Western Counties Commercial and Tourist Railway Guide. Brendons, Plymouth. First number, May, 1877.

Remarks on the English Channel Ports of Portsmouth and Plymouth. Sir W. F. Martin. 1865.

Report on proposed turnpike road from Plymouth and Devonport to St. Austell through Looe and Fowey. J. M. Rendel. 1835.

Signal Recorder (The). C. McGuire Bate. *Royal Engineers' Journal.* 1880.

Sketch of existing Restrictions on Banking, and Doubts of the soundness of the Principles on which they rest. [Sir] J. S. Trelawny. Byers, Devonport. 1847.

Stevens on Stowage. 7th ed. 1878.

Tables of Corn and Flour, French and English relative prices. Luke, Plymouth.

Tables for the Use of Persons Employed in Mines. W. Whitburn. J. and H. Smith, Plymouth. 1852.

Trade (The) of Plymouth. W. F. Collier. Plym. Inst. Trans. vi. p. 379. [Reprinted.]

PERIODICAL PUBLICATIONS.

Devon and Cornwall Illustrated Weekly. Trythall, Plymouth. May, 1874. (Speedily discontinued.)

Devon and Cornwall Magazine (fortnightly). William Locke, Plymouth. A. Gray, Dock. 1781.

Devon and Cornwall Masonic Register. 1877–8, '78–9, '79–80. Westcott. Plymouth.

Devonport Congregational Magazine. Edited by Rev. W. Mc Owen. First No. January, 1876. (Discontinued). Comley, Morice Town. 1876.

Devon and Cornwall Temperance Journal, changed its title into Good Templar, January, 1874. (Discontinued.)

Emigrants' Penny Magazine. J. B. Rowe, Plymouth. 1850–1.

Globe (The), died in 1873.

Heale's Monthly Diary. Plymouth, 1876. (Discontinued.)

Lantern (The), and Torpoint, Saltash, Polbathick, and St. Germans Review. Gamlen Brothers, Plymouth. (Discontinued). 1870.

Literary Chronicle: a Miscellany of General Literature. Plymouth. 1849.

Magnet: a Weekly Periodical. Cann, Plymouth. 1875. (Few numbers only issued.)

Maker and Rame Temperance Advocate and Monthly Visitor. Cole, Stonehouse. December, 1876.

Men of the West. J. L. Hatton. J. Thomas, Plymouth. 1877. [An illustrated biographical serial. Three numbers issued; first, January, 1877.]

Millbrook Church Annual. J. Bartlett. Husband, Devonport. 1874.

Monthly Advertiser. R. W. Stevens, Plymouth. December, 1875.

Naval and Military Directory. (Continues.) Swiss, Devonport. 1877.

Nunkey: a Comic Weekly. Hainsworth and Co., Plymouth. [First number, September 16th, 1876; died after a few issues.]

Plymouth Guardian: Weekly Paper. [Conservative; short lived.]

Plymouth Star.

Plymouth Weekly Times in December, 1873, became West of England Advertiser (was soon discontinued).

Stonehouse Church Annual (The). P. H. Newnham. Cole, Stonehouse. 1874.

Thunderbolt. Last number, July 13th, 1872.

Voice of the People. Plymouth, 1875. Tichbornite (few numbers only).

Western Beacon and Three Towns Monthly Advertiser. Jewell and Micklewood, Plymouth. 1854.

Western Beacon. Plymouth, 1875. (Weekly; short lived.)

Western Figaro. Illustrated Weekly. Commenced November, 1877. Originally published by Screech and Dunstan; now by Dunstan and Hearle.

Westward Ho: the Western Magazine. Lake, Truro. 1874. Edited by W. R. Soleman. (2 nos. only.)

Very few of the periodicals noted above have had a long life, most expiring before reaching half-a-dozen numbers. Of the comic issues the *Figaro* has been by far the most successful. Several parishes now issue monthly localized Church Magazines.

POETRY AND GENERAL LITERATURE.

Adventures (The) of Joseph Goulding; his Courtship and Marriage with Flora Pearceval, the Duchess of Botiani: a Tale of Love in Fairy Style, with other Poems. John Rounsevell, the Tregatherall Shepherd. Latimer, Plymouth. 1864.

Ainslie, George. M. A. Paull. 1873.

Alice Mitchell's Last Theft. By the author of Johnny's Bible; Rose's First Shilling. H. Edwards.

Amy Ray. M. A. Pollard. Lidstone, Plymouth.

Arscott of Tetcott. W. H. Luke, Plymouth. 1880.

Baron of Borrowdale, and other Poems. Charles Bennett. Wood, Devonport. 1874.

Bird Angel. M. A. Paull. 1874.

Boar's Head, and other Tales. M. A. Paull.

Borders of the Tamar and Tavy. Anna Eliza Bray. Second Edition. Brendons, Plymouth. 1879.

[The first edition was issued in 1837 in three volumes; the present, in two, was edited by Mrs. Bray after she had passed her ninetieth year.]

Brother's Legacy; or, Better than Gold. Matilda Mary Pollard. 1872.

Ballad of Proud Maid of Plymouth.

Carmina. R. H. Taylor. Bond, Plymouth. 1821.

Caxtonia's Cabinet. W. H. Soleman. London. 1866.

Chantry Rhymes. Madge Hine. Brendons, Plymouth. 1880.

Clavigo: a Tragedy from the German of Goethe. Ann Thomas. *Monthly Magazine*, vol. xviii. 1834.

Crosses of Chloe. M. A. Paull.

Daily Bread on the Waters. M. M. Pollard. 1874.

Diver's Daughter. M. A. Paull. 1872.

Earl's Daughter: a Story for the Young. M. M. Pollard. 1872.

Eddystone Lighthouse (The): a Poem. M. R., late schoolmaster of Cahir. 1820, '24, '32.

Effie Forester, and other Tales. M. A. Paull. 1878.

Eight Watches; or, The History of Jack Steadfast. John Bunce. H. Granville, Devonport. 1832.

Elegy on the Death of W. Shepherd, Esq., merchant, of Plymouth, May 25th, 1784. By H. Mends (in a conversation between Gabriel and His Guardian Angel). Plymouth. 1785.

Elegy on the Death of John Kelly, Esq., solicitor, Plymouth. Hampden Wotton. 27th August. 1879.

Enchanted Rock. Percy B. St. John.

Fight (A) with Fortune. Mortimer Collins.

Fireside. Percy B. St. John.

Fisherman's Children and Edith's English Home. Lidstone, Plymouth.

Flowers by the Wayside of Life. H. Marles. Devonport.

Flower of the Grassmarket. M. A. Paull.

Forget-me-not: Poems. M. G. Whitehouse, Saltash. J. R. H. Spry, Devonport. 1869.

Fragmentary Lines, written in anticipation of a Royal Visit to inaugurate the laying of the Foundation Stone of a new Eddystone Lighthouse. Hampden Wotton. 1879.

Frances: a Novel. Mortimer Collins. 1874.

Frank and Elijah; or, The Secret of the Sea. M. A. Paull. 1879.

George Ainslie. M. A. Paull. 1872.

Glenalladale Hall: a Tale of Culloden. [— Fox, Plymouth.] E. Stock, London. 1873.

Grave (The), by Blair; Gray's Elegy, Porteous on Death, Evening Reflections, and A Soliloquy in a Country Churchyard. H. Moore. Heydon, Dock. 1804.

Handy Volume Shakspere (The). Hampden Wotton. Trythall, Plymouth. 1875.

Homeward Bound; or, Jack Wilson's Return from Sea. M. M. Pollard. S.P.C.K. 1872.

Home Walks and Holiday Rambles. C. A. Johns.

Hours of Childhood. Lidstone, Plymouth.

Index Catalogue (Plymouth Free Library). W. H. K. Wright. Keys, Plymouth. 1877.

——————— Supplementary ditto. 1879.

——————— Additions. 1880.

Inn of Strange Meetings, and other Poems. Mortimer Collins. 1871.

Isandula: A descriptive Ballad. T. J. McCartney. Luke, Plymouth. 1879.

Ivory Gate (The). Mortimer Collins. 1869.

Lays, Lively, Ludicrous, and Lachrymal; or, Sparks from Mount Parnassus. Silex et Ignis. Lidstone, Plymouth. 1850.

Letter on Mr. Madan's Thelypthora. H. Moore.

Lexicon of the Thoughts in the English Language. N. Littleton. Brendon, Plymouth. 1854.

Lines suggested by the Death of the Prince Imperial. M. B. Stidston. 1879.

Little Cripple. M A. Paull. 1862.

Miscellaneous Poems. J. Rounsevell. Latimer, Plymouth.

Mr. Carrington. By R. T. Cotton [M. Collins]. 1873.

Nancy and Kate. M. A. Paull. 1871.

Nelson: a Drama in Three Acts. T J. McCartney. G. P. Friend, Plymouth. 1876.

Legend (A) of Mutley Plain; or, the Feast of the Warders. By Plymothian. [W. H. K. Wright.] Friend, Plymouth. 1875.

Legend (The) of Blackfriars Lane: a Poem Dedicatory at the Opening of the New Guildhall, Plymouth. John Webb. Latimer, Plymouth. 1874.

Letters from a Mother to her Children. Plymouth Dock.

Marquis and Merchant. Mortimer Collins. 1871.

Merchant (The) of Plymouth. Tragedy founded on the Story of Page of Plymouth. MS. in Fox's Memoirs, in the Plymouth Library. Lyne Brett.

Miner's Son and Margaret Vernon. M. M. Pollard. 1872.

Miranda. Mortimer Collins. 1873.

Minister's Daughter and Old Anthony's Will: Tale for the Young. M. M. Pollard. 1872.

Minstrel's Tale. George Moore. R. Williams, Devonport.

Old Farm House; or, Alice Morton's Home, and other Stories. M. M. Pollard. 1872.

On the best means of Promoting the Free Library Movement in small Towns and Villages. W. H. K. Wright. Trans. London Conference of Librarians. [Reprinted.] 1878.

Original Poetry for Children. J. Trenhaile. Heydon, Devonport. 1846.

Our Obligations to Greek Thought. C. Chapman. Plym. Inst. Trans. vi. p. 225.

Pen Tamar. By H. M. Bowdler, [with views of Plymouth.] 1830.

People's Embassy (The). Nemo. W. H. Luke, Plymouth. 1876.

Philosophy of the Heart. P. B. St. John.

Plymouth and its Surroundings: a Poem by a Retired Surgeon, R.N. Cann, Plymouth. 1874.

Plymouth in an Uproar: Comic Opera. Neville. Music by Dibdin. 1779.

Plymouth, Strange News from; or, a Wonderful and Tragical Relation of a Voyage from the Indies, how the Crew Cast Lots for their Lives, and were Forced to Eat one another; and how a Dutch Merchant Eat Part of his own Children, and then Murdered himself because he would not Kill his Wife. 1684.

Poems for the People. J. Trenhaile. Heydon, Devonport. 1846.

Poems, &c., on various subjects. John Phillips. Plymouth Dock. *c.* 1818.

Poems on Several Occasions. Ann Dunsterville, of Plymouth. 1807.

Poems on Various Occasions. Ann Thomas, Millbrook, widow of an officer in the Royal Navy. 1784.

Poems on Sacred, Philanthropic, and Rural Subjects; composed chiefly in a state of Blindness. W. Mann, Plymouth. 1846.

Poetic Fragments. M. Frost. Plymouth. 1864.

Poetical, and other Pieces. By E. R. Plymouth. 1837.

Poetical First Buds. C. E. Rich. Lidstone. 1851.

Poetical Remains of Shepherd (Hy. Savile, second son of the late W. Savile Shepherd, of Coxside, near Plymouth.) Selected and arranged by the Rev. J. Garton. Devonport. 1835.

Poetical Sketch of the late Abraham Lincoln. W. Kelk. Pyke, Devonport. 1874.

Poetical Tour in the Years 1784–1786. Mrs. Parsons. 1787.

Poetry and Prose for the Pearl of Days. Edgar Mould. G. P. Friend, Plymouth. 1876.

Private Life: a moral rhapsody. H. Moore, Plymouth. 1795.

Pounceford Hall. B. Clarke.

Quadroona. P. B. St. John.

Queen (The) and other Poems. T. J. McCartney. Friend, Plymouth. 1875.

Quicksands and Whirlpools. P. B. St. John.

Rector of St. Judy. W. R. Soleman. 1876.

Remarks on the British Association's Visit to Plymouth. H. Wotton. Luke, Plymouth. 1877.

Richard Cœur de Lion: a Poem. A. Edwards. Brendons, Plymouth. 1878.

Restoration of St. Andrew's Church, Plymouth. W. H. K. Wright. Friend, Plymouth. 1875.

Retirement, with other Poems. C. Redding. Rees and Curtis. 1810.

Romance of a Rag, &c. M. A. Paull.

Romeo and Juliet Travesty. Rd. Gurney. Jenkins, Plymouth. 1812.

Rooker Memorial (The): a Poem. Hampden Wotton, Plymouth. 1878.

Royal Embassy (The) a Poem. Hampden Wotton. Luke, Plymouth. 1876.

Secret of Long Life. [Mortimer Collins.] 1871.

Selections from the Early Ballad Poetry of England and Scotland. R. J. King. 1852

Singers in the Storm. [Christmas number of *Christian World.*] M. A. Paull. 1873.

Skittish Association (The) at Tamarworth. Brendons, Plymouth. 1877.

Sketches and Studies. R. J. King. Murray. 1874.

Sofa's Story. M. A. Paull.

Songs from the Heart. W. R. Soleman. 1860.

Songs from the West. W. R. Soleman. 1872.

Song Streams. J. Gregory. Friend, Plymouth. 1877.

Sought and Saved. [£100 prize tale.] M. A. Paull. 1880.

Spanish Armada: Descriptive Historical Poem in Commemoration of the Opening of the New Guildhall. W. H. K. Wright. Friend, Plymouth. 1874.

Special Collections of Local Books in Provincial Libraries. W. H. K. Wright. Trans. Oxford Meeting Library Association. [Reprinted.] 1879.

Spiritual Poems. F. Collins. May, Plymouth. 1826.

Spelling B (A); or, a Tale with a Sting: [poetry.] Latimer, Plymouth. 1876.

Squire Silchester's Whim. Mortimer Collins. 1873.

Strange News from Plymouth; or, a Wonderful and Tragical relation of a Voyage from the Indies. 1684.

[Tells the story of a crew who from want fell into cannibalism, and the survivors of whom walked ashore from the ship at the Land's End over the ice.]

Summerhouse Stories. M. A. Paull. 1880.

Sunways: a Record of Rambles in Many Lands. W. C. Borlase. Brendons, Plymouth. 1878. [Private circulation only.]

Sweet and Twenty. Mortimer Collins.

Theatric Tourist. By an Amateur. 1805.

[Has views of twenty-three Theatres, including Exeter and Plymouth.]

Three Monks (The) of St. Germans: a legend of Beelzebub, with Bub's remarks on Cook *v.* Jackson. Bazley, Plymouth. 1876.

Tommy Gamp's letter to his cousin in London on the Devonport Railway and other important improvements. Husband, Devonport, 1873.

Transformations: thoughts suggested by the opening of the Plymouth Free Library. W. H. K. Wright. 1876.

Transmigration. Mortimer Collins. 1874.

Tregeagle of Dozmary Pool and other Poems. Bond, Plymouth.

Trip (A) to the Hill Country of Cyprus. Charles McGuire Bate. *Royal Engineers' Journal*, and reprinted. 1876.

Truth's Mirror [poems]. R. Hennah. Plymouth.

Two Sisters. M. M. Pollard. 1872.

Vale of Lanherne. H. S. Stokes.

First edition printed by Byers, Devonport. 1836.

[The author then used to write the leaders for the *Independent*, also published by Byers.]

Village Verses, &c. Guy Roslyn. [Joshua Hatton.] Friend, Plymouth. 1876.

Vivians (The) of Woodiford. M. A. Paull. 1879.

Vivian Romance (The). Mortimer Collins. 1870.

Voice (A) from the Police Court; or, the danger of too much punch. By Saint Meva [J. Harris]. Brendons, Plymouth.

West County Garland. R. N. Worth. Brendons, Plymouth. 1875.

White Stone Canoe. Percy B. St. John.

Wit and Humour (Poets'). Selected by W. H. Wills.

Will. Norbury, a tale of the Cornish coast. B. Clarke. 1875.

POLITICS AND SOCIETY.

ACTS OF PARLIAMENT.

Devon and Cornwall Railway. (Sale and transfer to London and South Western.) 1874.

To incorporate a company to make a quay-wall at Stonehouse Pool, and a line of railway to connect the quay with the Devon and Cornwall Railway. 1876.

Authorising the Duke of Cornwall and the Sutton Harbour Improvement Company to carry into effect agreements for certain purposes. 1876.

For compensating proprietors of lands in Cornwall and Devon for lands purchased for the better defence of the Dockyard at Plymouth. 1782.

Acts to take land. 1757, 1758, 1759.

Against the extortions of the officers of the Customs at Fowey, Plymouth, Dartmouth, and Pool. 1449.

For the better security of Hamoaze harbour. 1811.

Repealed and other provisions made. 1814.

Acts regarding the acquisition of land for Devonport Dockyard. 1774, 1824, 1854.

New Act for Devonport Water Company. 1877.

Address on the Wealth of the Working Classes of Great Britain. James Spry. August, 1871.

Ancient Ritual of the Order of Patriotic Odd Fellows, whose rules were renewed in the year 1797. James Spry. July, 1875.

Odd Fellows Text-book. James Spry. 1873.

The Unity Compact. James Spry. 1873.

An Alphabetical List of Persons Relieved by the Corporation of Guardians of Plymouth from 30th March, 1861, to 28th September following. J. Thomas, Plymouth. 1871.

Assize Extension. J. Shepherd. Brendons, Plymouth. 1877.

[Advocating the claims of Plymouth to be an Assize Town.]

Council of State's Policy; or the rule of Government set forth. By R. Spry, of Plymouth, gentleman. 1650.

Charter (The) of the Borough of Plymouth, and the case of Rock [Roche] against Berry in the Queen's Bench, 1712. Plymouth. 1813.

Connection (The) between Church and State. P. Holmes.

Contagious Diseases Acts (The) and the Royal Albert Hospital. M. Nicholson. Pyke, Devonport. 1874.

Correct Copy (A) of the Charter of Incorporation of the Borough of Devonport, with list of the first Council elected, and map of the Borough. Devonport. 1838.

Devonshire Farm Lads. J. M. Hawker. Dev. Ass. Trans. vii. p. 270.

Devon and Cornwall Botanical and Horticultural Society Reports. 1st. 1831. Saunders and Haydon, Plymouth.

Domestic Servitude in Devonshire a hundred years ago. J. M. Hawker. Dev. Ass. Trans. vi. p. 206.

Earliest (The) and Best means of elevating the Social and Moral condition of the Working Classes. Prize Essay by C. Jones. Devonport.

Early Commerce of Plymouth (The). R. N. Worth. Plym. Inst. Trans. vi. p. 290.

English State Church and Tithe Question: an essay. Thomas Victor. Latimer, Plymouth. 1875.

Friendly Address (A) to the Agricultural Labourers of the Parish of Newton Ferrers. J. Yonge. Rowe, Plymouth. 1837.

Friendly Societies in the County of Devon Certified and Enrolled from 1793 to 1835. J. Tidd Pratt. 1856.

Hints on Retrenchment in the Expenditure of the Public Money. Addressed to William Shield, Esq., Commissioner of H.M. Dockyard, Devonport. By John Provis. Byers, Devonport. 1828.

[Refers to machines for drawing water.]

Inquiry into the Past and Present State of the Labouring Population and Pauperism of England. J. D. Tuckett. May and Son, Plymouth. 1845.

Irish Church Question (The). P. Holmes. 1868.

Letters on the Burials' Bill. (Reprinted from John Bull.) C. C. Bartholomew. 1876.

Letter (A) to Lord Holland on the Law of Libel. C. Redding. Rees and Curtis, Plymouth. 1812.

Letter on the Reform of the Superior Courts of Common Law, to the Right Hon. Lord John Russell. R. P. Collier. 1851.

Letter to the Treasurer Guilford. Signed Rob. Spry, Solicitr. Seque: Nov. Devis. Kinterbury Street, Plymouth, 15 Dec. 1648. Brit. Museum, Addit. MSS. 5494, fol. 100.

Letter to Mr. William Lilly (the Astrologer), London. Signed Robert Spry, East gate in Plymouth, 22 Feb. 1654. Brit. Museum, Addit. MSS. 4293, fol. 135.

Matrimony. J. Maynard. 1871.

New Scheme (A) for the Plymouth Public Dispensary. W. H. Alger. Brendons, Plymouth. 1877.

Outlines of a Scheme for the Amalgamation of the Plymouth Provident and Public Dispensaries. W. H. Alger. Brendons, Plymouth. 1878.

Notes on the Present Organization of the First-class Army and Militia Reserves. Capt. C. F. Colville, 11th Foot. Brendons, Plymouth. 1876.

Pauperism in Plymouth: Report of the Committee on Out-door Relief, with the Discussions at the Board of Guardians, July 23rd, 1861. Brendon, Plymouth.

Proposals for the Benefit of the Naval Service. [Yeoman Lott.] 1776.

Question (The) of the Day: How are we to get Recruits, and how are we to Organize our Army. By a Staff Officer. Thorne, Plymouth. 1873.

Questions on Company Drill. Keys, Plymouth. 1872, 1877.

Questions on the Formation and Evolution of a Battalion, &c. Keys, Plymouth. 1872.

Report of Mr. Bellamy to the Water Committee, accompanying Plans of a Storeage Reservoir to be constructed at the Head Weir. Bowering, Plymouth. 1877.

Report of Exchequer Proceedings upon a Demurrer by the Duke of Cornwall against Sir John St. Aubyn and others, with Judgment of the Court in a case against the Mayor of Plymouth. 1812.

Report on the Sanitary Condition of London. J. Letheby.

Sailors' Rest (The), and Work Afloat and Ashore. A. Weston. 1879.

Salutation (The) or Loyal Welcome (English and Latin) to His Royal Highness William Henry (of Great Britain, &c.; Prince) in the West. By Edward Spry. The third edition, sold by the booksellers of Great Britain and Ireland. Plymouth: printed at P. Nettleton's office, on the Parade. No date. [1786.]

Six extemporaneously-compos'd masonic songs on Great Britain's Prince William Henry, becoming a free-mason, on March 9th in the year of masonry 5786, [of] christianity, 1786. By Edward Spry. Printed by Brothers Trewman and Haydon. To be had of the tilers at the various lodges, booksellers. No date. [1786.]

The masonic quintetto quintiple harmonious concordance, or sacred music accompaniment; viz.: a masonic mandate, hymns, anthems, a lyric and oratorial ode, on the intended consecration of the masonic lodge (amphibious) at the Royal marine barracks, Stonehouse. By Edward Spry, Candidate of divinity; Bachelor of musick; Doctor of philosophy, laws, and medicine; of the Royal college of Physicians, London and Edinburgh; of Oxford, Cambridge, &c.; R.A., Knight templar and of the Oriental star, &c., &c., &c. To be had at the stationers, Plymouth Dock, Stonehouse, &c. An. L. 5786, Xsti. 1786. [Dedication to "Gulielmo Henrico," Magniæ Britaniæ Principi.]

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[Neither Mr. nor Mrs. George Linnæus Banks is connected with the Three Towns, and their works therefore are out of place in this Bibliotheca. Their inclusion arose from the singular fact that, although no relation, there is a Mr. Linnæus George Banks, a native of Devonport, son of Mr. George Banks, who has written occasional poetry.]

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OBITUARY NOTICES.

THE LATE WILLIAM FROUDE, F.R.S.

By the death, on May 6, 1879, at the Cape of Good Hope, whither he had gone for the benefit of his health, of William Froude, F.R.S., England has lost one of her most distinguished mechanicians and engineers, Devonshire one of her greatest scientific worthies, and the Plymouth Institution one of the most notable and valued of her honorary members. Mr. Froude came of a remarkable family. His elder brother was the well-known Richard Hurrell Froude; his younger James Anthony Froude, the historian, also one of the honorary members of this society. Born in 1810, Mr. William Froude was one of the pupils of Cardinal Newman, at Oriel College, Oxford, and took a first class in mathematics. Educated as a civil engineer, his rare abilities very early made themselves known, and he was for several years the constant and valued friend of the late Mr. Brunell. When in 1846, on account of his father's failing health, he retired from the ordinary duties of his profession, it was only to engage in the solution of some of the most complex and abstruse problems connected with the motion of fluids and the behaviour of floating bodies. These at length became methodized into an investigation on the rolling of ships, which he pursued year after year at his residence, Chelson Cross, Torquay, without personal reward of any kind, but with such recognition from the Admiralty as enabled him to carry it out in the most complete way as a national work of the highest value. Thoroughly versed in all the more distinctly scientific conditions of his subject, he was also a complete master of its technical relations —himself a skilled mechanician of the rarest excellence, and one of the most conscientious and ingenious of experimentalists. "No workman in any art ever combined in greater proportion, few in so eminent a degree, the three properties of culture, of science, and of practice. His hands were as skilful as his creative brain was active." For his "researches on the behaviour of ships, their oscillations, their resistance, and their propulsion," Mr. Froude, in 1876, received the gold medal of the Royal Society, of which he had been elected a Fellow six years previously; and the president on that occasion remarked that Mr. Froude's investigations completely took the lead in this question, so important to a maritime nation; and that no one had ever done so much towards the establishment of a reasonable theory of the oscillation of ships in wave-water, as well as for its experimental verification. Shortly after public attention had been called to this subject by the melancholy catastrophe of the loss of the *Captain*, Mr. Froude made an exposition of his favourite study the subject of one of the most valuable lectures ever delivered before this Institution. The results of Mr. Froude's labours are chiefly embodied in scattered papers and official reports; but among his inventions, apart from those connected with his special subject of enquiry, is a dynamometer for measuring the power delivered at the end of the screw shaft in large marine engines.

THE LATE EDWARD HEARLE RODD.

The Institution has likewise to regret the loss by death of one of its oldest corresponding members, the late Edward Hearle Rodd, of Penzance, the most distinguished ornithologist that Cornwall has produced—one who held in that county and for his own day somewhat of the position that Colonel Montague occupied in a former generation for Devon. A member of an old Cornish family, third son of the Rev. E. Rodd, of Trebartha, he became a solicitor, and was for many years in practice at Penzance, of which borough he was Town Clerk until he resigned that office in favour of his partner, Mr. T. Cornish. His first publication, a List of British Birds, with special reference to the peculiarly rich ornithology of Cornwall, was published in 1864, and was reissued in the same form, subsequently expanding into an elaborate and valuable work on British ornithology, published by Messrs. Trübner, and completed not long before the author's death. Mr. Rodd was a frequent contributor to local and other scientific societies on his favourite study, and the Plymouth Institution was indebted to him for many valued communications. The very extensive and valuable collection of birds which he had formed, and which includes a greater number of rare species than any other in the West of England, is now deposited under his will as a heirloom at the family seat, Trebartha.

ANNUAL REPORTS

AND

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AND

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